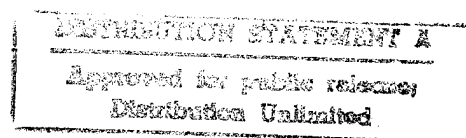




COMPENDIUM OF OPERATIONS RESEARCH AND ECONOMIC ANALYSIS STUDIES

APRIL 1996



19960514 023

FOR
DEPARTMENT OF DEFENSE
DEFENSE LOGISTICS AGENCY
OPERATIONS RESEARCH OFFICE (DORO)
RICHMOND, VA 23297-5082

INSIGHT THROUGH ANALYSIS

DORO

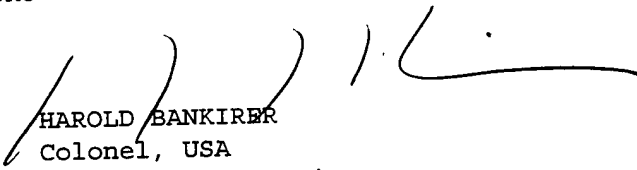
DMIC QUALITY INSPECTED 1



DEFENSE LOGISTICS AGENCY
OPERATIONS RESEARCH OFFICE
DORO
c/o DEFENSE SUPPLY CENTER RICHMOND
RICHMOND, VIRGINIA 23297-5082

FOREWORD

This edition of the 'Compendium of Operations Research and Economic Analysis Studies' updates the 1992 issue, published by DLA-LO, with abstracts of studies completed through Fiscal Year 1995 by DLA's Operations Research and Economic Analysis Office. We retained all abstracts of studies completed from 1986 through 1992, unedited and as they previously appeared, to provide a 10 year history. Readers are advised the compendium is a reference document and the findings of the studies are objective results reached by individual analysts. And we caution readers these findings should not be necessarily interpreted as action taken by management. For further information on a specific study, please contact DORO either on Autovon 695-3764 or on commercial (804) 279-3764.


HAROLD BANKIRER
Colonel, USA
Chief, DLA Operations
Research and Economic Analysis Office

ABSTRACTS

**DLA-95-P50237. A Study to Determine Whether an Economic Benefit Analysis to
Index No. 95-36 Support the DLA Standards Improvement Plan is
Methodologically Feasible.**

DORO perform the COTR function for this Peat Marwick project. Refer to Contract Number SPO410-94-D-0005, Delivery Order Number 0011. The study assessed the feasibility of developing a sound method for calculating the economic benefit derived from the conversion of military specifications to performance specifications, non government standards, or commercial item descriptions. Two benefit categories of primary concern were benefits resulting from before and after conversion purchase price differences, and the amount of savings generated by changes in safety stock level due to conversion. Peat Marwick concluded that the development of such a methodology was feasible.

**DLA-95-A50199. Support for DRMS Privatization Assessment Team
Index No. 95-35 (Sep., 1995)**

This project provided direct support to the Corporate Administration Defense Reutilization and Marketing Service (DRMS) privatization assessment team. The team documented and assessed the DRMS approach and recommended some possible alternatives. Related regulations, laws, guidelines, and directives were examined and other disposal models in the Federal Government were documented. CA provided the results of the review and recommendations in a report to VADM Straw.

**DLA-95-A50176. Contract Workload and Savings Projections
Index No. 95-34**

The Defense Contract Management Command (DCMC) has been tracking cost savings and cost avoidance associated with their management of contracts since 1993. Seventeen areas of opportunity have been identified, each having a specific method of measuring savings. Recently, contract volume has declined and DCMC management expects this trend to continue. DCMC needed to know what levels of cost savings and cost avoidance can be expected over the period 1996 - 2001. Regression analysis and exponential smoothing were used to generate these forecasts. Those forecasts generated by regression analysis used the number of contractor employees and dollar value of contractor shipments as the independent or predictor variables. Two major factors negatively influencing regression forecast attempts were (1) too few observations and, (2) widely fluctuating data points. In general, the forecasts predicted a relatively flat trend line from historical 1995 levels.

DLA-94-A50156. Sufficiency Analysis COR Services
Index No. 95-33 (May, 1995)

This effort was conducted by KPMG Peat Marwick under contract to DORO. The project conducted a sufficiency analysis for the DoD Major AIS Review Council (MAISRC) Milestone 1 review of the Standard Procurement System (SPS). The analysis addressed the Defense Procurement CIM Systems Center (DPCSC) program estimate and focused on high cost and high risk areas within the estimate.

DLA-95-P50155. Net Landed Cost Model (Sep., 1995)
Index No. 95-32

In order to be able to make better business decisions, both DLA and its customers must understand the costs associated with providing various services. In the current competitive fiscal environment, DLA must be able to describe (and allocate) its costs more precisely than it has done in the past, lest customers look elsewhere for their distribution services. This project was the initial effort to attempt to describe DLA's distribution costs more precisely through the development of a prototype cost allocation model. This effort identified significant data shortcomings which must be overcome if DLA's costs are to be allocated equitably.

DLA-95-P50130. Data Integrity (Data Policy and Procedures)
Index No. 95-31 (Sep., 1995)

Provided analytical support to DLA's Information Services Data Integrity effort as a member of the Data Policy and Procedures team. Provided input on high-level business rules including those developed by other Data Integrity teams), DLA policy and procedures, with the emphasis that statistical quality and process control principles are utilized where appropriate. The efforts of the team are not yet complete in any of these areas and support is expected to continue through FY96.

DLA-95-P50129. Data Integrity (Data Quality Control Process)
Index No. 95-30 (Sep., 1995)

Provided analytical support to DLA's Information Services Data Integrity effort as a member of the Data Quality Control Process team. Investigated and evaluated automated data quality tools, provided input on business rules and statistical process control, supported development of the DLA Data Quality Control Process, and initiated a prototype data quality project to demonstrate the value of the data quality control process. The efforts of the team are not yet complete in any of these areas and support is expected to continue through FY96.

DLA-95-C50109 & C50121. Analytical Support to Naval Log 2003 Wargame
Index No. 95-29 Operations Research and Economic Analysis
 Studies (Jan., 1995)

To support the Joint Staff, J-7, Deliberate Planning Conference under the Dual Major Regional Conflict (MRC) Scenario, DORO was directed to actively assist the Navy with their Naval Logistics 2003 Wargame. Our support took the form of assisting OPNAV-Code-N41 in developing DLA 9-COG requirements by both hull and airframe type to support world-wide deployments. Analysis results were developed which were unique to fourteen ship types and thirteen aircraft configurations, on a time-phased basis. These results were presented to the appropriate working groups which conducted the wargame on-site at the Naval War College. A post MRC analysis was also conducted which projected industrial base investment requirements on a two year basis that would be needed to restore the force to a ready condition.

DLA-95-P50105. Data Validation Filter for Executive Information System
Index No. 95-28 Data (EIS) (Sep., 1995)

A module to validate data during the process of loading data into the Defense Logistics Agency (DLA) Executive Information System (EIS) was developed under a separate effort. The module uses business rules developed by the user to determine data quality. This study utilized that same data validation code to create a stand-alone model, adding a statistical screening technique and user interfaces to automatically convert commonly used data bases to the format used by the EIS module. The statistical screening technique combines Statistical Process Control (SPC) and Single Exponential Smoothing (SES) as a "canned" business rule in the stand-alone model. A forecast is developed using SES, then the difference between the actuals and forecasts are used to determine if the value being checked is within a statistically reasonable range using SPC techniques. A menu option was developed to automatically convert commonly used data base formats to facilitate the use of the stand-alone model at all organizational levels throughout DLA.

DLA-94-A50084. Environmental Reporting Logistics System
Index No. 95-27 (May, 1995)

This effort was conducted by KPMG/Peat Marwick under contract to DORO. A centralized automated system has been proposed to provide comprehensive logistics data required for the introduction, procurement, supply, distribution, use and disposal of hazardous materials. The project developed an economic analysis of the proposed system. Sponsored by the Defense Logistics System Center (DLSC).

DLA-95-P50082. Analysis of Depot Test of Cycle Time Reduction
Index No. 95-26 (Jul., 1995)

Major General Babbitt, Deputy Director for Materiel Management, asked the DLA Supply Centers and Depots to reduce pipeline time by 50 percent this year. At the Department of Defense (DoD) Reduced Logistics Response Time (72 Hour)

Steering Group meeting in October 1994, Brigadier General Burch, Executive Director (Distribution), committed DLA to a two depot test where routine Materiel Release Orders (MRO) processing and hold times would be reduced and the impacts measured. A stand alone depot, Defense Distribution Depot Richmond, VA (DDRV), and a depot collocated with a maintenance facility, Defense Distribution Depot Red River, TX (DDRT) were selected for the test. The test period was from 1 January 1995 through 30 March 1995 and was limited to Issue Priority Group 3 (IPG 3) MROs that were wholesale items shipped to off-base customers. Success was defined as a depot attaining and maintaining at least a four day standard from MRO receipt to ship. The test evaluated performance and cost and documented test findings and results. The performance and costs during the test period were compared to a baseline period. The baseline period was assumed to represent current depot operations. The depots provided a depot profile and narratives to provide information on unquantifiable events that impacted the test such as depot closure due to weather, equipment downtime, operating system downtime, depot procedural changes, etc.

DLA-95-P50044. Defense Contract Management (DCMC) FOCUS Survey Statistical Index No. 95-25 Support (Sep., 1995)

The DLA Operations Research and Economic Analysis Office (DORO) supported the analysis of the FY94 DCMC customer satisfaction survey. DORO, in conjunction with an outside contractor, interpreted the survey results statistically, compared this year's survey results with that of the previous year, and helped draft a FY94 report issued by the DCMC Focus team. In addition to the survey analysis, DORO did developmental work on the database cataloging customer satisfaction information submitted via postcard trailer. The postcard format had changed significantly which necessitated numerous database changes in order to accommodate the old and new formats.

DLA-95-P50037. Certification of the New Bid Evaluation Model Index No. 95-24 (Jun., 1995)

This was a short term project, 274 hours. The purpose is to Certify the DFSC Bid Evaluation Model. This is an enhanced PC based implementation using Linear Programming which will supercede the older mainframe version. DORO was tasked with performing an independent study to certify the new BEM. This was accomplished by developing a top down certification to validate the functioning of this contractor developed (Nelson & Associates) model. The text of the final Letter Report is provided below.

1. Review of Algebraic Formulation: DORO has reviewed the Algebraic Code used to build the Linear Program utilized by the Bid Evaluation Model (BEM). The objective is to minimize the total laid down cost to the government for buying fuel. This objective is subject to various constraints such as satisfying demand, not exceeding capacity in the system and meeting government mandated set asides. The Algebraic formulation is efficient, solid and provides the "optimal" solution.

2. Review of FOX PRO Code: DORO has reviewed the negot.prg and force.prg modules in the FOX PRO implementation portion of the BEM. These modules

control Data management functions associated with small business setasides and negotiations. The modules operate as intended and ensure that government mandated setasides are met.

3. Test Cases: One central test case was developed for comparison purposes with the BEM. A subcase involving a forced constraint was also generated. The BEM and DORO model both generated the same solution. The DFSC MEDIUMTS model was used to verify the functioning of the 8a setaside module. The DFSC SDBTEST model was used to verify the functioning of the sb setaside module. Finally, the DFSC LARGESB model was used to verify the functioning of the sb setasides.

4. Conclusion: The DORO office based on this top level review of the DFSC Bid Evaluation Model which included review of the mathematical program, data management functions of FOX PRO and the results of test cases concludes that the model developed by Nelson & Associates performs as intended, and that any awards determined by the model are correct and defensible.

**DLA-95-P50017. A DLA Study on the Costs of Reducing Depot Processing and
Index No. 95-23 Transportation Times**

Every inch that we can take off of the logistics pipeline is known to result in reduced customer inventories; and therefore, it reduces costs to the taxpayer. However, unlike many other DLA response time reduction initiatives, this report addresses response time reductions in areas that are known to have cost implications to the wholesale organizations. Many logisticians believe that these added costs will be minimal in light of the potential retail inventory reductions associated with faster wholesale replenishment. In this report we quantify the costs incurred by DLA as depots reduce requisition bank time, hold time, and in-transit time. Furthermore, we investigated different stock positioning issues relating to range and depth of stock in order to provide a reduced response time at the lowest possible cost.

**DLA-94-A40273. DLA Catalog System COR Services
Index No. 95-22 (May, 1995)**

This effort was conducted by KPMG/Peat Marwick under contract to DORO. The project documented and analyzed the existing cataloging and ordering system used by DLA and its customers for commercially available items. The Integrated Definition (IDEF) methodology to develop functional activity process mode of the As-Is business environment. This is the first of a series of projects planned to develop a commercial on-line catalog of DLA-managed items.

**DLA-95-P40264. Implementation of the WIS Warfighting Preparedness
Index No. 95-21 Indicators (Sep., 1995)**

In FY94, the Corporate Performance Office (CAAF) tasked DORO to develop measures for indicators in the warfighting preparedness module of the Executive Information System (EIS). During that year, DORO created the computational methodologies, related documentation, and on-line help screens

for the indicators. The next fiscal year CAAF asked DORO to implement the methodologies. The effort included several dimensions: (1) the construction of five scenario demand streams; the execution of the DLA Asset Sourcing and Sustainment Model (DASSM) for each scenario's demands; the development of DASSM post-processing programs; the collection of bulk fuel data; the calculation of indicator values on a quarterly basis; and the maintenance of DASSM, related data, and on-line help.

DLA-95-P40258. SAILS Model Support for BRAC 95
Index No. 95-20 (Jun., 1995)

The SAILS (Strategic Analysis of Integrated Logistics Systems) model was applied to examine DLA's distribution network in support of DLA's overall analysis for BRAC 95. This project focused on the development of an integration approach to ensure that the SAILS analysis would complement the other portions of the analysis, as well as the actual conduct of the distribution network optimization analysis. The results of this analysis identified optimal distribution network operating costs for the alternatives of interest.

DLA-95-P40257. Procurement Management Information System (PMIS) Phase II
Index No. 95-19 (Sep., 1995)

The Procurement Directorate requires timely management information. This information is essential to insure appropriate oversight of Center performance, attainment of corporate objectives, and success of procurement strategies. Phase I of this project established the initial Active Contract Files (ACF) and Active Purchase Request Files (APRF). In this project we implemented a "hands off" file transfer procedures, automated data extraction and file production process, added Customer Depot Complaint System (CDCS), requisition history, consumable item transfer, contract technical data file, and item data to the PMIS. We also improved the documentation the data bases, mainframe programs, and FOXPRO programs.

DLA-95-P40255. Consumable Items Transfer Analysis - Pricing Review
Index No. 95-18

The purpose of the analysis was to conduct an item level price impact evaluation. Specifically, to assess potential price differences between current DLA price structures versus what the price of an item could be expected to be if the item had remained under Service management. The guidance for the analysis mandated that all CIT items actually transferred to DLA from the Services between the first quarter of FY92 and the fourth quarter of FY94 be included. Additionally, the study group was charged with conducting the analysis based on the "end price" that the customer would actually pay for the item. The study team concluded that the Navy, Air Force, and the Marine Corps all realized savings from DLA management of transferred CIT materiel. However, no price comparisons could be made between the other Services and the Army since the Army does not track consumable and repairable materiel price changes separately.

DLA-95-P40249. Demand Impacts Due to USAF Weapon System Deactivations
Index No. 95-17

This study modified the methodology previously developed for Navy Ship Decommissioning to account for Air Force weapon system deactivations as they impact demand forecasts and requirements calculations in SAMMS. SAMMS has no means to correctly forecast demand based on known weapon system phase-outs. This study covered historical demand data for DLA-managed hardware items from one Air Force base (Cannon), one weapon system deactivation (F-111 aircraft). The prototype was tested at DGSC for the General Commodity.

The results of this study determine the historical demands for general commodity at DGSC hardware center. It determined the quantity of demand decreased and generated a quarterly forecast of demand (QFD) by item given the lead time phased with deactivation date. DORO provided DGSC with forecast decrement quantities. DGSC SAMMS processed the Air Force percentage of demand based on the forecast decrement quantities and an initial run has resulted in an estimated forecast reduction of \$200,000 on 81 NSNs at DGSC.

DLA-95-P40248. Force Reduction Impacts On Demand
Index No. 95-16

This study is a continuation of 'Demand Impacts Due to Ship Decommissionings' (P40058). Again, all Navy hull specific data was derived from SPCC data provided through NAVSUP. We used the methodology already developed to determine historical demands for DLA managed hardware items from specific ships designated for decommissioning. It determined the quantity of demand decrease and generated a quarterly forecast of demand (QFD) decrement given the time phased ship decommissioning schedules. We identified and verified unique items (defined to be those which are only used on ships scheduled for decommissioning) whose demand will change to zero, as well as common items, to determine the amount of demand decrease that is to be expected. We exported the results to the DLA Hardware Centers for evaluation and implementation as appropriate.

DLA-95-P40246. Analytical Support for Buy Response Vice Inventory Team
Index No. 95-15 (Sep., 1995)

This project continued support to the Buy Response Vice Inventory (BRVI) Team at DLA Headquarters that began in FY94 under project number DLA-94-P30428. This effort provided quarterly updates to the BRVI Measures of Success Metrics created as part of the FY94 BRVI project. An analysis was done investigating 5 year trends in the use of various contract types for use at the DLA Commander's Conference. Another study identified Original Equipment Manufacturers of high demand items currently purchased through intermediate vendors as candidates for Corporate Contracts.

DLA-95-P40243. Automated Best Value Model (ABVM) Support (Sep., 1995)
Index No. 95-14

ABVM assists buyers in making "best value" procurements rather than just awarding to the lowest price offer. ABVM provides convenient summarized ratings of the vendor's past performance during the past two years. ABVM is interfaced with an on-line procurement system called the DLA Pre-Award Contracting System (DPACS) so that buyers can conveniently evaluate both cost and performance when making awards. ABVM provides overall performance, overall quality, overall delivery, product packaging, laboratory test, percent on time delivery, and average days late ratings by Federal Supply Class (FSC) and Defense Supply Center.

This project provided continued support for the ABVM Operation Pilot. DORO provided technical support to provide DPACS and Electronic Bid Board enhancements. DORO also modified ABVM rating procedures and facilitated ABVM processing, decreasing ABVM Administrator workload.

DLA-95-P40242. Defense Performance Review Metrics Wood Products Initiative
Index No. 95-13

A test was conducted to compare the performance of local purchase against a modified form of central procurement for wood products. During a test period of January 1, 1995 through September 30, 1995, two Marine bases were each instructed to purchase wood products via one of the test methods and to report test metrics. The base using local purchase reported generally higher prices averaging about 10% along with longer lead times of 9 days. The quality of material delivered was judged to be the same in each test case. The customers of local purchase reported higher levels of satisfaction during the test but the differences were reduced between the two sites during the conduct of the test. Therefore, it was concluded that the modified central procurement method was competitive with local purchase and should be expanded into additional geographical areas where the demand and market conditions warrant a similar contract type.

DLA-95-P40241. USAF Wing Commanders Flexibility Program PHASE-II
Index No. 95-12

This project evaluated test results of extending the Air Force Wing Commanders' Flexibility Test Phase-II across the Department of Defense (DoD). This analysis was to explicitly review all test buys conducted by the Air Force against DLA managed items. Specifically, the assessment was to examine cost, delivery performance, and quality. The study team evaluated the total purchase cost and item delivery performance on a statistical basis. Item quality was indirectly assessed by coordinating with the Air Force purchasing staff at the test bases who verified item specification requirements with the DLA's technical standard staff at Columbus (DCSC-VER) who had overall responsibility for confirming item specification needs. We concluded that items with specifications were properly purchased by the test bases. However, the personnel cost involved with verifying these specifications was not captured. The local purchase option should continue to be permitted on an emergency need basis.

DLA-95-P40189. DLA Industrial Preparedness Planning Model
Index No. 95-11 (Mar., 1995)

This project focused on providing a management indicator which can provide visibility of the ability of the production base to meet surge and mobilization production needs. Utilizing the TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) key critical weapon system components (by NSN) were identified, which can be used to aid in the selection of items for planning as part of the Industrial Preparedness Program (IPP). The Initial DORO Blue Cover Report which provides the methodology and background is entitled "DLA INDUSTRIAL PREPAREDNESS PROGRAM (IPP) ITEM SELECTION INDICATOR" dated December 1987. The model was ported from the mainframe to the HP. The product of this study was reports generated for the ICPs and headquarters, and periodic briefings.

DLA-95-P40180. MTMC/DLA Joint Container Consolidation Analysis (Apr., 1995)
Index No. 95-10

This study was jointly sponsored by the Defense Logistics Agency (DLA) and the Military Traffic Management Command (MTMC). The purpose of the study was to determine how many containerization sites the Department of Defense (DoD) requires in the current downsizing environment and how should less than container load (LCL) cargo be routed so as to minimize cost to DoD. This analysis differed significantly from previous studies in that it was performed from a DoD perspective and the study's costs were not calculated using MTMC or Military Sealift Command (MSC) billing rates. The scope of the study included nine containerization sites: two Consolidation and Containerization Points (CCPs), managed by DLA, and seven Container Freight Stations (CFSs), managed by MTMC. The study was limited to the handling of LCL general cargo and household goods. These categories of cargo can be handled by both CCPs and CFSs and represent the bulk of the export containerization business. The study established a baseline cost, representing the cost of the current system, and costed out two alternatives: optimal routing with all stuffing sites open and optimal routing under various scenarios of export containerization mission closures. To cost out the baseline case and the two alternative scenarios a FORTRAN model was developed that ran on a 486 PC. The analysis was based on a projected FY95 workload of 474,000 measurement tons (mtons) of export cargo. The model did not use billing rates. Instead, the model inputs were actual DoD outlays, e.g., payments to carriers, to contractors and GS salaries. The study contained the following major conclusions. The DoD has excess export LCL cargo containerization capacity. The two CCPs have sufficient capacity for all DoD general cargo and household goods. The principal cost driver for determining the optimal (least cost to DoD) containerization sites is inbound transportation cost with stuffing cost being a secondary cost driver. The study recommended that MILSTAMP routing guidance be updated to designate the CCPs as primary consolidation sites for European and Far East/Pacific destinations and the Seattle, WA CFS should be designated as primary site for the Alaskan LCL export cargo.

DLA-95-P40168. Defense Logistics Agency Market Basket
Index No. 95-09

The primary objective of this study effort was to provide DLA management with the ability to evaluate DLA performance in controlling the material cost of items sold to the services. A series of indices, similar in concept to that used to calculate the Consumer Price Index, was developed that allowed comparison in DLA price and cost growth or decline relative to general market trends. Two separate general measures that distinguish between the price of goods sold and the cost of goods bought were created. In addition, index substratifications were examined to determine any differences in prices experienced by the various services and to identify any advantages in cost control by various procurement instruments such as indefinite delivery contracts. Other facets of the indices were developed by restricting the items under consideration to those that generated consistent demand over the time periods or those that consistently had buys over the time period.

DLA-95-P40158. Cost of Nonconforming Supplies Update
Index No. 95-08 (Oct., 1994)

This report updates the 1989 study of the cost of nonconforming supplies. Nonconforming supplies are those whose defects prevent their use for their intended purpose. These nonconformances are documented on a Product Quality Deficiency Report (PQDR). Quantified components of nonconforming supplies costs were subdivided into administrative processing costs and material holding costs. These costs were computed not only for each DLA supply center but also, where possible, at the Federal Supply Group (FSG) and the Federal Supply Class (FSC) levels. The output of this study are costs formulae showing the administrative costs as a constant and the holding costs as a percent of the average contract value for each FSG or FSC at a supply center.

DLA-95-P40139. Analysis of Delivery Evaluation Factor Application
Index No. 95-07 (May, 1995)

This study evaluated the use of Delivery Evaluation Factors (DEF) at the DLA hardware Centers. DEF clauses allow the buyer to factor earlier delivery schedules into the award process by costing the benefit of early delivery and reducing the bid price of a vendor who offers earlier delivery. Data from the Defense Industrial Supply Center (DISC) from Jan 92-Jun 94 was analyzed to determine the effect of the program. The other Centers had insufficient experience to evaluate historical data. The analysis showed that DEF buys were associated with large reductions in Production Lead Time and late deliveries and contributed to an overall reduction in PLT at DISC. Average unit prices were not found to be adversely affected by DEF. However, it was observed that the benefits of a DEF buy were not completely sustained in subsequent non-DEF buys. Because of this and the fact that each Center used a different mathematical formula to apply DEF, we recommended an alternative method which will reduce the amount of the factor.

**DLA-95-A40132. Standard Procurement System (SPS)/Mechanization Of Contract
Index No. 95-06 Administration Services (MOCAS) Functional Economic
 Analysis (FEA) Enhancements (May, 1995)**

This study focuses on the successful migration of the DLA Defense Contract Management Command's (DCMC) contract administration information management system (MOCAS) to an upgraded and enhanced system referred to as SPS/MOCAS. The study facilitated this effort in two ways. The first involved developing detailed data and activity models of the contract close-out process. Integrated Computer Aided Manufacturing Definition (IDEF) software was used to generate these "As-Is" models. The data models were used by DLA Systems Design Center (DSDC) to produce requirement analysis information for SPS/MOCAS. The second part of the effort was on benchmarking the DCMC close-out function. This effort included the identification of: customer critical success factors, problem areas, and, key activities, as well as establishing performance measures, acquiring and analyzing data, and developing recommendations for process improvements.

**DLA-95-P30211/P30163. An Analysis of the Requirements Levels and
Index No. 95-05 Performance Projection Modules of the Corporate
 Information Management Requirements System
 (Oct., 1994)**

The Joint Logistics Systems Center (JLSC) is tasked to implement standard wholesale inventory management systems throughout the Department of Defense. The primary purpose of these new systems is to eliminate duplicate systems and systems management while increasing inventory management efficiencies with reduced costs. This goal encompasses many areas of wholesale logistics systems. One of these areas includes the mathematical models that minimize inventory cost while determining when and how much to order for item stock replenishment. This report focuses on the assumptions, application, and performance of various reorder point and reorder quantity models.

**DLA-95-P30165. Exploring The Multi-Link Concept For Defense Logistics
Index No. 95-04 Agency Requirements Determination**

This analysis was conducted in support of the Joint Logistics Systems Center (JLSC) and the Defense Logistics Agency (DLA). It was completed by the Logistics Management Institute (LMI) under delivery order #DL311MR1 and was technically supported by the DLA Operations Research Office (DORO). Under this concept, the Services and DLA can potentially realize the benefits of readiness-based sparing (RBS) without requiring additional data collection or disrupting operational procedures to compute stock levels. Although in theory the Multi-Link concept will improve Service and DLA weapon system support, the concept has not yet been field tested and a number of critical issues remain to be resolved prior to its use. This includes a significant increase in the total dollar investments for DLA managed weapons materiel at the wholesale level. However, total DoD dollar investments would, in theory, actually decrease.

DLA-95-P30163/P30211. **An Analysis of the Requirements Levels and
Index No. 95-03 Performance Projection Modules of the Corporate
 Information Management Requirements System
 (Oct., 1994)**

The Joint Logistics Systems Center (JLSC) is tasked to implement standard wholesale inventory management systems throughout the Department of Defense. The primary purpose of these new systems is to eliminate duplicate systems and systems management while increasing inventory management efficiencies with reduced costs. This goal encompasses many areas of wholesale logistics systems. One of these areas includes the mathematical models that minimize inventory cost while determining when and how much to order for item stock replenishment. This report focuses on the assumptions, application, and performance of various reorder point and reorder quantity models.

DLA-95-P30101. **Customer Sampling Plan (Jul., 1995)
Index No. 95-02**

This project developed a plan for conducting recurring surveys of Defense Logistics Agency customers, in support of the DLA Corporate Customer Assessment Team. The primary product was a sampling plan, including stratification of customers by Military Service or Federal Agency and by commodity purchased from DLA, and sample size calculations for each stratum. The secondary product was a customer data base, identifying customers by activity name, major Service or Agency, mailing address, and Department of Defense Activity Address Code (DoDAAC). Number of requisitions submitted and the dollar value of those requisitions are included for each customer, for each commodity, using fiscal year 1994 data. While the data base was initially developed to provide required address information for mailing customer satisfaction surveys, it is very useful in examining requisition data on individual customers and groups of specific customer types, both within and across individual Inventory Control Points.

DLA-95-P20135. **Investigation Of Alternative Shipping Practices
Index No. 95-01 (Aug., 1995)**

In March 1992 the Defense Logistics Agency (DLA) assumed management and control of 22 additional supply depots from the military services. Many of the service depots were not participating in Guaranteed Traffic (GT), a highly successful bid based program used by DLA for almost all of its second destination transportation needs. DLA decision-makers recognized that, given depot consolidation and new stockage policies, there was potential to implement new and innovative transportation practices at the depots. Four practices identified as potential candidates for use were point to point service, stopoff at origin, stopoff at destination, and split delivery. Models were developed to analyze each of these practices.

DLA-94-P81062. Supply Support Determination Model
Index No. 94-44

This project was conducted in support of HQ DLA Materiel Management under contract to Synergy (Contract # DLA600-88-C-5071) and was administered by HQ DLA Corporate Research (CAIL and originally DLA-LOM). As a result of the FY94 DLA reorganization, the DLA Operations Research Office (DORO) was designated as the repository for this study effort. All deliverables under this contract have been met. Executable models have been provided to DORO and DISC for follow-on testing. The pc-based model operates in a Lotus Spreadsheet, while the mainframe model is written in COBOL. HQ DLA (MMS) has directed that initial testing be conducted by both DORO and DISC for the purpose of assessing whether or not the Agency should invest additional funds to document and implement these models at the Supply Centers. This testing will be conducted as consultations by DISC and DORO during late FY94 and early FY95.

DLA-94-P81024. Forecasting Demand For Weapon System Items
Index No. 94-43

The Defense Logistics Agency (DLA), the DoD's wholesale manager for consumable hardware items, can improve forecasts of demand for weapon system items by changing its forecasting method to single exponential smoothing of historical demand.

Overall, this method outperforms DLA's current forecasting method, as well as a program-based forecast, when forecasts are ranked in terms of supply performance for a given level of inventory investment. The program-based forecast performed slightly better than single exponential smoothing on single-application items from weapon systems with decreasing programs, but we do not recommend program-based forecasts even in this case, because of the difficulty of implementation. In contrast, single exponential smoothing is straightforward to implement, and it is already an option under DLA's Composite Forecasting, now under development.

DLA should continue its current effort to project the effect of weapon system phaseouts on item demand. Item managers' knowledge could then be used to reduce stock levels and buys for affected items.

DLA-94-P50094. Cost of Reports of Discrepancy Update
Index No. 94-42 (Sep., 1994)

This study updates the DORO report titled Administrative and Holding Costs Resulting from Processing Reports of Discrepancy (DLA-90-P90136). Reports of Discrepancy (RODs) are generated when shipments within the DoD supply system have been improperly packaged or shipped. RODs in this study were caused by the contractor or subcontractor. The primary costs considered in this study are administrative costs for personnel involved in RODs processing and holding costs for items in suspended status during resolution of the ROD. Personnel costs were estimated by using probabilities of involvement for Quality Assurance, Contracting and Production, etc. One major finding of the study was that the Defense Contract Management Command (DCMC) is involved in ROD

resolution far less than was originally believed. Expected DCMC costs are, therefore, much lower in this update. Final costs found in this report can be used as part of the bid evaluation process. Combining a contractor's ROD history with these cost estimates gives a more accurate "cost" of doing business with individual contractors.

DLA-94-P40259. Lab Testing Sampling Model (Aug., 1994)
Index No. 94-41

The purpose of this project is to develop a user friendly, windows based (FOX PRO) product that can be utilized by lab testing personnel at each ICP to select random NSN's for testing on a quarterly basis. After the testing results are received, the results are reported to headquarters. This project is a follow on effort to the Sampling Assistance Model (SAM) and LABMENU model developed in DORO during FY 92 and 93. The current model employs Simple Random Sampling (SRS) to make statements about the overall level of quality of DLA stock. The deliverable for this project was the FOX PRO developed Sampling Assistance Model (SAM) with accompanying training manual.

DLA-94-P40198. SAILS Model Data and Methodology Development for BRAC 95
Index No. 94-40 (Sep., 1994)

This project focused on the development of data and an overall approach for conducting an analysis of DLA's distribution network in support of BRAC 95. This effort culminated in the receipt of approval from DLA's BRAC Executive Group on the use of the SAILS (Strategic Analysis of Integrated Logistics Systems) model as an additional source of information for the DLA BRAC analysis process.

DLA-94-P40185. Economic Analysis for the Over and Above Centralized
Index No. 94-39 Information System (OACIS) (Aug., 1994)

This annotated briefing documents the economic analysis for the Over and Above Centralized Information System (OACIS). Over and above work is unplanned maintenance and overhaul of aircraft or major sub-assemblies. OACIS has been in use since 1989; the proposed new OACIS would be more generic to accommodate a wider variety of Courier (W1), over and above work. The Savings to Investment Ratio (SIR) for the proposed system is 9 to 1. Recommended that proposed OACIS be developed to take advantage of projected cost savings.

DLA-94-P40158. Cost of Nonconforming Supplies Update
Index No. 94-38

This report updates the 1989 study of the cost of nonconforming supplies. Nonconforming supplies are supplies whose defects prevent their use for their intended purpose. These nonconformances are documented on a Product Quality Deficiency Report (PQDR). Quantified components of nonconforming supplies costs were subdivided into administrative processing costs and material holding costs. These costs were computed not only for each DLA supply center but also, where possible, at the Federal Supply Group (FSG) and the Federal

Supply Class (FSC) levels. The output of this study are costs formulae showing the administrative costs as a constant and the holding costs as a percent of the average contract value for each FSG or FSC at a supply center.

DLA-94-P40157. Identifying the Impact of Cancellations/Terminations and Reprocurements (Sep., 1994)
Index No. 94-37

The DLA Supply Centers use a Termination Decision Model that recommends cancellation of contracts or purchase orders for items under certain conditions, such as expected overstock. DORO was asked by AQP to determine the number of orders for items that were canceled after a cancellation recommendation was made by the model. For those ordering instruments that were canceled, the amount of time that elapsed before the same items were repurchased was determined. The canceled items were listed by supply center and included number of canceled order documents, Quarterly Forecasted Demand (QFD), Procurement Lead Time (PLT), and other information requested by the client. The results were used to help determine the effectiveness of the Termination Decision Model.

DLA-94-P40156. Procurement Management Information System (PMIS) Phase I
Index No. 94-36 (Sep., 1994)

The Procurement Directorate requires timely management information. This information is essential to insure appropriate oversight of Center performance, attainment of corporate objectives, and success of procurement strategies. In this project we evaluated the functional requirements, determined the hardware and software required, developed data base structures, wrote programs to extract and compute data, and developed file transfer procedures. PMIS mainframe programs extracted Active Contract Files (ACF) and Active Purchase Request Files (APRF) and passed the data to a minicomputer server. PMIS users queried the data with PC FOXPRO menu programs. The PMIS was operational and was being used by DLA Headquarters for ad-hoc queries before the conclusion of Phase I of the PMIS project.

DLA-94-P40135. Automated Best Value Model (ABVM) Support (Sep., 1994)
Index No. 94-35

ABVM assists buyers in making "best value" procurements rather than just awarding to the lowest price offer. ABVM provides convenient summarized ratings of the vendor's past performance during the past two years. ABVM is interfaced with an on-line procurement system called the DLA Pre-Award Contracting System (DPACS) so that buyers can conveniently evaluate both cost and performance when making awards. ABVM provides overall performance, overall quality, overall delivery, product packaging, laboratory test, percent on time delivery, and average days late ratings by Federal Supply Class (FSC) and Defense Supply Center.

This project provided continued support for the ABVM Operation Pilot. DORO provided technical support to interface ABVM with the Electronic Bid Board and

DLA-94-P40128. Defense Contract Management (DCMC) FOCUS Survey Statistical
Index No. 94-34 Support (Sep., 1994)

DLA-94-P40064. Executive Information System (EIS) Forecasting Toolkit
Index No. 94-33 (Jun., 1994)

DLA-94-P40059. Expedited Delivery for High Cost Routine Priority Items
Index No. 94-32 Operations Research and Economic Analysis Studies
(Jul., 1994)

16

DLA-94-P40058. Demand Impacts Due To Ship Decommissionings
Index No. 94-31

This study had two stages. In the first stage, a methodology was developed to determine historical demands for DLA managed hardware items from specific ships designated for decommissioning. NAVSUP provided historical usage data for 9-COG items from SPCC. It determined the quantity of demand decrease and generated a quarterly forecast of demand (QFD) decrement given the time phased ship decommissioning schedules. We identified and verified unique items (defined to be those which are only used on ships scheduled for decommissioning) whose demand will change to zero, as well as common items, to determine the amount of demand decrease that is to be expected. This methodology was developed and tested at Defense General Supply Center (DGSC). Under the second stage, we exported the methodology and results to the other DLA Hardware Centers for evaluation and implementation as appropriate.

DLA-94-P40037. Optimal Stock Points Analysis
Index No. 94-30

This project was charged with the task of optimally positioning all Defense Logistics Agency (DLA) managed "high driver" stocked items. This analysis focused on those National Stock Numbers (NSNs) which contribute the most to annual processing costs which had an annual demand quantity of at least 12 and a new procurement within the previous 24 months. This population set comprised 80 percent of the Agency's new procurement receipts and 50 percent of total demands. Significant findings were the following:

- a. Four or fewer depots were required to optimally stock 92 percent of the items based on fully optimized transportation costs covering both the first and second destinations. The set of four depots did vary between NSNs.
- b. The two Primary Distribution Sites were always part of the optimal solution.
- c. Depots with collocated maintenance facilities and significant regional customers were found to retain a significant distribution workload which was optimal; i.e., Norfolk in the east, Red River, San Antonio, San Diego, and Puget Sound in the west.

DLA-94-P40034. Update To Contracting Cost Factors Used In The
Index No. 94-29 Contract Termination Model

This is a study to update and revise the cost factors contained in the Cost Data File of the Contract Termination Model (CTM). The CTM is used by DLA Supply Centers to evaluate whether or not existing contractual actions are still cost effective. The validity of the Contract Termination Model is dependent on accurate inventory, reprocurement, and termination cost data. The cost factors in the Cost Data File of the Contract Termination Model were revised using the latest policy guidance and the best available data for estimating costs. The Cost Data File should be replaced by each center to reflect the updated cost factors derived from this study to ensure the validity of the CTM.

DLA-94-P40021. Analytical Support to the Business Development Team for
Index No. 94-28 Federal Contract Administration (FEDCAS) (Mar., 1994)

This report outlines the analytical support provided to the Business Development Team in marketing Defense Contract Management Command (DCMC) contract administration services to the Federal civilian agencies. It develops individualized contract administration cost estimates for 23 civilian agencies. These estimates were derived from DCMC FY 93 unit cost experience. Selected contract workload information (data extracted from the Federal Procurement Data

Center) was also provided for each agency. The geographic overlap of DoD and civilian contracting efforts was demonstrated graphically.

DLA-94-P40016. Stock Placement at Defense Depot Norfolk, Virginia
Index No. 94-27

Defense Distribution Depot Norfolk Virginia (DDNV) operates an automated bin facility composed of a Carousel area and an Automated, Storage, and Retrieval System (ASRS) called the Ministacker. The design of the automated bin facility and the controlling software, the Naval Integrated Storage, Tracking and Retrieval System (NISTARS), make it very efficient in processing receipts and issues for small, lightweight items. Unfortunately, the Ministacker and Carousel areas are currently underutilized with item storage at roughly 42 percent. Consequently, this analysis evaluates all appropriate active stock at DDNV for loading the Ministacker and Carousel areas more effectively. Conclusions and recommendations are to reconfigure the Ministacker mainly by converting 66% of its smallest locations (M4s) to its largest locations (M0s). Load the Ministacker and Carousel areas with the high-demand consumable items followed by the high-demand repairable items. Then, as space permits, finish loading with the lower-demand consumable items first and the repairable next.

DLA-94-P30354. Warfighting Assessment Analysis (Sep., 1994)
Index No. 94-26

The Warfighting Assessment Analysis project originally had four objectives: (1) construct the "most demanding" requirements files from Operational Plans (OPLAN); (2) determine if the Rapid Response Mobilization Indicator (RRMI) model should be exported; (3) gain access to on-line Standard Automated Materiel Management System (SAMMS) files to get current asset information for crisis-action planning; and (4) interface the Optimum Stockage and Repair Analysis Program (OSRAP) and RRMI.

Most demanding files. DORO used seven OPLANS to create the "most demanding" files as defined by CAILW, but because new Defense Planning Guidance focuses a Dual Major Regional Conflict (MRC), CAILW directed DORO to archive the files and not to expend any further effort on them.

Exporting RRMI. After a discussion with DORO, CAILW decided not to export RRMI. Because RRMI output is only meaningful after being specially post-processed or run through the item selection indicator (ISI) model, and

due to a current effort by the Industrial Support Team (AQPON) to develop a new prioritization scheme, CAILW terminated the effort.

SAMMS on-line files. DORO developed and tested programs for pulling current asset and due-in information from SAMMS and for formatting it as input for the DLA Asset Sourcing and Sustainment Model (DASSM). In a crisis-action situation, DORO can take OPLAN requirements and the most current asset position and run both through DASSM. Assuming no special reports would be needed, this could be done within twenty-four hours.

Status of RRMI/OSRAP interface. DASSM incorporates RRMI capabilities making it unnecessary to interface RRMI with anything in the future. Because OSRAP functions as a part of ALOG, DASSM will interface with the ALOG database directly and OSRAP indirectly. While DORO has not yet created the needed code for the interface, DORO and TRW agreed on the data formats for information exchange.

DLA-94-P30312. Analytical Support for the Defense Contract Management
Index No. 94-25 Command (DCMC) Communication Survey (Sep., 1994)

The DLA Operations Research and Economic Analysis Office (DORO) supported the DCMC internal communication survey. DORO participated in the survey design, computed the survey sample sizes necessary for the reliability desired by the communication survey team. DORO produced a random sample of all DCMC employees listing the names and addresses of those who received the communication survey. DORO, in conjunction with an outside contractor, interpreted the survey results statistically and helped draft a survey report issued by the DCMC communication survey team.

DLA-94-A30308. Privately Owned Vehicle (POV) Travel Commitments
Index No. 94-24 (Jul., 1994)

This study focuses on validating a methodology submitted at various times to the Office of the Secretary of Defense, Production and Logistics, the Per Diem Travel and Transportation Allowance Committee, the General Services Administration, the Secretary of Defense, and finally the Director, Defense Logistics Agency. The methodology was submitted by a DLA employee and urged the adoption of a POV/GOV travel policy which would, according to the employee, result in significant savings to the agency. Analysis showed that while savings may be realized significantly increased expenses might also occur.

DLA-94-P30277. Analysis of Overseas Shipping Practices (May, 94)
Index No. 94-23

This analysis addresses the issue of whether shipping freight to the Military Traffic Management Command's (MTMC) Container Stuffing Activities (CSAs) would be a more cost effective way for the Defense Logistics Agency (DLA) to containerize cargo for surface overseas movement than the current practice of shipping freight to the Consolidation and Containerization Points (CCPs). The

study covers these three scenarios: the baseline case (or status quo), routing all DLA general cargo through the CCPs, and routing all cargo through the CSAs. The analysis includes the transportation cost from shipper to stuffing activity and the cost of seavan stuffing at that activity.

The results of the study are based on 343,249 measurement tons of general cargo from DLA shippers going overseas during FY 92. The major conclusion of the study is that it is cheaper for DLA shippers to send their cargo to the CCPs. When compared to the baseline scenario, routing all cargo to the CCPs was found to cost \$451,000 less annually. When compared to the CSA scenario, routing all cargo to the CCPs was found to cost \$2.6 million less annually. Principal reason given for the lower cost of the CCP scenario was cheaper van-stuffing rates at the CCPs.

DLA-94-P30269. DoD Inventory Sampling Plan (Aug., 1994)
Index No. 94-22

DORO, DLA-MMD, the Office of the Secretary of Defense, Service Logistics managers, and the DoDIG worked together to develop a single inventory sampling plan. The plan was designed to meet the dollar-weighted materiality requirements of the Chief Financial Officers' Act as well as satisfying the logistical policy requirement to reflect record accuracy.

DORO played a major role in designing a two-stage stratified sampling plan and provided the actual randomly selected items for the physical inventory. The plan provided statistical estimates for both the dollar value of inventory at the service level and record accuracy for DoD as a whole.

DLA-94-P30258. Service Unique Items Analysis
Index No. 94-21

This study addressed several critical issues related to positioning items which were unique to a given Service near the primary customer base. Army data was provided by the Logistics Control Activity through its Logistics Intelligence File (LIF). All Navy data was provided by NAVSUP and excluded NAVAIR unique requirements. Marine Corps input was provided by Marine Corps Logistics at Albany, while Air Force data from selected MAJCOMs was provided by the Logistics Management Agency at Gunter Air Station. Results of the analysis, which was restricted to assessing transportation costs, generally concluded that the two Primary Distribution Sites, together with selected collocated maintenance and distribution centers were the most cost effective. Those distribution points which did not have maintenance facilities were the least cost effective in supporting service unique materiel.

DLA-94-P30255. Acquisition of Service Data for the DLA Integrated Data Bank
Index No. 94-20 (DIDB) (Sep., 1994)

For the past several years, the Defense Logistics Agency (DLA) has been pursuing several major initiatives involving supply depots, stock positioning and warfighting support. To perform studies in these areas, DLA needed to have a good understanding of its customer's requirements. Although the DLA

Integrated Data Bank (DIDB) contains extensive information about the items DLA manages, very little information is available on Service managed items. To remedy the situation, the DLA Operations Research Office (DORO) began an effort to add item information, wholesale demands, retail demands, and asset information from Service automated systems to the DIDB. Points of contact (POC) in the four Military Services provided DORO with system and file information to determine what data was available. Later, most services provided DORO with sample data extracts. Up to this point, the Services had not required DORO to pay for the initial data extractions but indicated that future processing costs would have to be funded by DLA. The information collected from the Services on data is available to DORO analysts for future project work. Individual data calls to the Services can be initiated as required and funded on a case by case basis.

DLA-94-P30248. Analytical Support for Buy Response Vice Inventory Team
Index No. 94-19 (Sep., 1994)

This project provided analytical support for the Buy Response Vice Inventory (BRVI) Team at DLA Headquarters. The BRVI Measures of Success Metrics were created and updated quarterly. The metrics include 132 graphs and tables of statistics on requisition response time and usage of the Direct Vendor Delivery method. Also under this project, an analysis was done to determine the top 50 vendor candidates for Corporate Contracts with DLA.

DLA-94-P30243. Enhanced Near-term Forecasting for DLA in SAMMS (Sep., 1994)
Index No. 94-18

The Joint Logistics Services Center is the proponent for a mainframe forecasting program called PD80. The Navy has the task for developing and implementing PD80 so that it can function with the Standard Automated Materiel Management System (SAMMS). Because of the potential advantages of improved forecasting methods, DLA desires a rapid fielding of enhanced forecasting modules for SAMMS. This study effort focused on developing, implementing, and tracking the performance of a PD80 prototype.

DLA-94-P30240. Depot Optimization Model Pilot Project (Jul., 1994)
Index No. 94-17

This effort focused on developing the capability to utilize an existing commercial distribution network optimization software package (Strategic Analysis of Integrated Logistics Systems - SAILS) for analysis of DLA's distribution system. This pilot effort consisted of two phases of progressive difficulty. The first phase modeled DLA's distribution of hazardous items, which represented approximately 2% of DLA's workload. The second phase entailed modeling all DLA managed items. This effort was successful in developing the capability to utilize the SAILS model in both a PC and a mainframe computer environment.

DLA-94-P30210. Forecasting DLA Supply Management Business Base
Index No. 94-16

The Defense Logistics Agency (DLA) is the primary worldwide supplier of consumable items and repair parts to the Department of Defense (DoD), and provides for other government agencies as requested. Decreases in the DoD budget, base closures, declining military personnel end-strengths, streamlining initiatives, and many other factors are combining to drastically effect DLA's business base. The Material Management directorate within DLA requires a model to forecast indicators of workload in order to assist in corporate strategic planning and resource allocation in the area of supply management. The model encompasses four hardware centers supplying construction, electronic, general, and industrial items. Annual sales from these centers exceed \$3 billion. Indicators of workload included in the forecast are gross demands, supply support requests, and gross sales. This project discusses development of the model and evaluation of the forecasts. Included are the various methodologies considered, assessment of independent variables, and application of the forecasts within DLA.

DLA-94-P30166. Forecasting Submodule in the Corporate Information
Index No. 94-15 Management System (Jul., 1994)

The Joint Logistics Systems Center (JLSC) is tasked to implement standard wholesale inventory management systems throughout the Department of Defense. The primary purpose of these new systems is to eliminate duplicate systems and systems management while increasing inventory management efficiencies with reduced costs. This goal encompasses many areas of wholesale logistics systems. One of these areas is demand forecasting. The JLSC standard is based on the Navy developed Statistical Demand Forecasting (SDF) system. This report focuses on issues relating to five SDF mathematical models and their applicability to DLA. Specifically, the five models cover the following topical areas: demand forecasts, leadtime forecasts, demand variance, leadtime variance, and leadtime demand variance.

DLA-94-P30156. Warfighting Assessment Analysis and Enhancement
Index No. 94-14

The purpose of this project was to address the Director of DLA's need for enhancing the Agency's capability to conduct supportability assessments of various warfight scenarios. The Director wanted to insure that the Agency possessed the ability to identify time-phased inventory shortfalls, weapon systems that were "at risk" due to inventory shortfalls, and investment costs needed to meet the Services' material requirements during both Joint Strategic Contingency Planning (JSCP) deliberate planning process and various crisis-action related scenarios. DLA's Operations Research Office (DORO) proposed enhancements to the Rapid Response Mobilization Indicator (RRMI) model and the development of post-processor programs to meet the Director's objectives. DORO completed the RRMI model enhancements, the required post-processor model development, and demonstrated the model's capabilities by performing supportability assessments of two actual Operation Plans (OPlans). One OPlan supportability assessment was briefed to the DLA Director, and presented at DLA's Commander's Conference. The Director approved the use of

the model for future warfighting assessments. DORO conducted a cursory investigation of the Military Services' capabilities to generate time-phased wartime/contingency operations material requirements, and discovered that all of the Services' have the capability to generate requirements but the degree of capability varies. The number of DLA managed items identified by the services in specific OPlans is limited. It is recommended that DLA sponsor a wartime material requirements generation workshop with the Services in order to obtain a more complete picture of the Services' capabilities to generate wartime material requirements. As a result of this analytic effort, the majority of the Director's warfighting needs have been addressed, with the exception of linking DLA supportability to its impact on readiness. The enhancements made to the RRMI model give the Agency the capability to determine its supportability for a given operation as well as the ability to identify investment requirements, isolate potential material shortfalls, and determine weapon systems "at risk" due to repair parts inventory shortfalls.

DLA-94-P30147. Development of Warfighting EIS Composite Indicators
Index No. 94-13 (Sep., 1994)

The Defense Logistics Agency developed an executive information system (EIS) for use by senior leadership at headquarters and primary level field activities. The system includes corporate information on agency financial status and other areas of corporate interest. One area important to the Director is the preparedness of DLA to support warfighting efforts. Because of the Director's focus, the Warfighting Preparedness module was added to the Corporate EIS to provide assessments of six key logistics readiness areas. The six areas of concern are weapon systems, personnel support, mission essential materiel, war reserve, logistics services, and bulk fuel.

The Corporate Performance office tasked the DLA Operations Research Office (DORO) to develop measures that generate indicator values for the six areas. In fiscal year 1994, DORO created the indicator measures and wrote supporting documentation. The project's report defines each indicator, describes the underlying measures, explains the parameters affecting the indicator values, and applies the indicators to example scenarios.

DLA-94-P30116. Cost of Late Delivery for Post Award Consideration
Index No. 94-12

This study provides contracting officers and administrators with cost data for use in negotiating consideration with delinquent contractors. Alternative ways of estimating the pertinent costs were reviewed, and the most appropriate methods were selected. Analysis of direct costs involved data from both engineered time standards and Activity Base Costing, as well as inputs from most of the supply centers. Indirect costs (i.e. costs of carrying additional inventory) were estimated using a modification of the approach used in precursor studies. Cost estimates are provided which are appropriate for determining consideration to be sought for late delivery for each supply center. In addition, indirect cost estimates are provided for each Federal Supply Class.

**DLA-94-P30064. Analysis Overseas Army Direct Support System (DSS) and
Index No. 94-11 Air Line of Communication (ALOC) Shipments (Oct., 1993)**

This is an analysis of the Army Outside Continental United States (OCONUS) Direct Support System (DSS) and Air Line of Communication (ALOC) performance standards to determine the impact of applying those standards to OCONUS DSS/ALOC shipments originating at Defense Logistics Agency (DLA) managed supply depots. The analysis is limited to the depot processing time and intransit time to the Consolidation and Containerization Points (CCPs) pipeline segments of routine requisitions. The DSS time standard requires an average order-ship-time of 7 days from the requisition receipt at the depot to the CCP whereas the ALOC time standard requires an average of 5 days from the requisition receipt at the depot to the CCP. Under current Uniform Materiel Movement and Issue Priority System (UMMIPS) standards, DLA depots have a 15 day standard. A linear programming model was used to develop proposed OCONUS DSS/ALOC time standards for each individual depot. The standards were tailored for each depot and are based upon the number of OCONUS DSS/ALOC requisitions filled by each depot. It was found that the proposed standard could be achieved with current depot resources and the Army could gain a one time pipeline savings of \$9.4 million.

**DLA-94-P30038. Analytical Support for the DCMC Customer FOCUS Survey
Index No. 94-10 (Apr., 1994)**

This report analyzes the FOCUS survey results compiled by an outside consulting firm. The 1993 FOCUS Customer Satisfaction Survey results are contained in an ACCESS database which was used to conduct the analysis for the 1993 survey results. The survey provides the customer's ratings of satisfaction and importance for a large number of functions performed by DCMC. A significant finding of the analysis was that DCMC needed to make certain that customers know their DCMC point-of-contact (POC). The communication problem and therefore the lower ratings, generally stem from the customer not knowing their point-of-contact (POC).

**DLA-94-P20317. Defense Contract Management Command (DCMC) Staffing
Index No. 94-09 Assistance Model Update (Jun., 1994)**

This study uses 1993 workload and staffing data to update DORO's 1991 DCMC Staffing Assistance Model. Staffing levels at all Secondary Level Field Activities (SLFAs) are estimated using regression analysis and key workload indicators, which now includes Unit Cost System data. The goal of this study was to develop a tool that is easier to use than the original models, and still provide a good level of accuracy. Analyses were also included on "open-the-door" thresholds, "comparative should be" staffing levels, and a workload share analysis. The tool that resulted is easier for planners to understand and use than the original models. Due to major organizational changes since the original study and resulting volatility in workload data, the final models contain slight slightly more error than in 1991. The models should be used along with non-quantitative reviews to help determine if staffing levels are appropriate.

DLA-94-P20250. Automated Best Value Model (ABVM) Decision Support System
Index No. 94-08 (Dec., 1993)

ABVM assists buyers in making "best value" procurements rather than just awarding to the lowest price offer. ABVM provides convenient summarized ratings of the vendor's past performance during the past two years. ABVM is interfaced with an on-line procurement system called the DLA Pre-Award Contracting System (DPACS) so that buyers can conveniently evaluate both cost and performance when making awards. ABVM provides overall performance, overall quality, overall delivery, product packaging, laboratory test, percent on time delivery, and average days late ratings by Federal Supply Class (FSC) and Defense Supply Center.

This project defined and documented the requirements for a decision support system to monitor the effectiveness of ABVM implementation. This study resulted in the development of a functional description defining 11 standard reports for measuring ABVM implementation effectiveness. This document will serve as the foundation for development of this system. This effort also resulted in a PC-based prototype system to demonstrate the generation of several of the standard reports.

DLA-94-P20249. Hardware Operational Pilot of Defense Logistics Agency (DLA)
Index No. 94-07 Automated Best Value Model (ABVM) (Sep., 1994)

ABVM assists buyers in making "best value" procurements rather than just awarding to the lowest price offer. ABVM provides convenient summarized ratings of the vendor's past performance during the past two years. ABVM is interfaced with an on-line procurement system called the DLA Pre-Award Contracting System (DPACS) so that buyers can conveniently evaluate both cost and performance when making awards. ABVM provides overall performance, overall quality, overall delivery, product packaging, laboratory test, percent on time delivery, and average days late ratings by Federal Supply Class (FSC) and Defense Supply Center.

ABVM was prototyped at the Defense General Supply Center and has been adapted to run at the Defense Construction Supply Center, Defense Electronics Supply Center, and the Defense Industrial Supply Center. Vendors are given the opportunity to review their delinquency and quality discrepancy data and request corrections by sending written justifications to the ABVM Administrators. Systems were developed to assist the ABVM Administrators to track these data corrections requests and update the data if necessary.

DLA-94-P20218. Economic Retention/Returns Limits
Index No. 94-06

The Defense Logistics Agency is required by the Department of Defense Instruction (DoDI) 4100.37, Retention and Transfer of Materiel Assets, to develop limits on the amount of stock held above that required for normal day-to-day operations. The retention policy stratifies wholesale assets into several levels. One of these categories is for economic retention stock. This analysis uses a break-even equation to determine the maximum amount of

stock that should be retained for economic reasons. The equation balances two alternatives available: (1) to incur the cost to hold the stock until it is used or (2) to dispose of the stock and take the chance that it may need to be reprocured to meet future demand.

DLA-94-P20199. Stock Location Analysis For Pipe, Wire Cable, And
Index No. 94-05 Bulk Steel Items

During 1992 the General Accounting Office (GAO) criticized the Defense Logistics Agency (DLA) for not disposing of items that were in long supply. Additionally, in 1993 DLA was critiqued by U.S. civilian news media for continuing to have excess of items and also for storing materiel outside in the open where it would be exposed to adverse weather conditions. During this same period, DLA has been evolving towards a stock positioning policy that places increased emphasis on meeting customer requirements as defined by a faster logistics response time (LRT). This latter requirement of shortening the LRT in a cost effective manner has been driven by the new Department of Defense Materiel Management Regulation (DoD 4140.1-R, published January 1993). This project was initiated to address both of the above issues for pipe, bulk steel, and wire cable items.

DLA-94-P20143. IMC Candidate Item Analysis
Index No. 94-04

The Integrated Material Complex (IMC) is an Automated Storage and Retrieval System (ASRS) located at Defense Depot Mechanicsburg, Pennsylvania (DDMP). The IMC is software-managed, equipped with conveyors, carousels, and automated guided vehicles (AGVs), and has a high-rise storage area with over 560,000 locations. As a unit the IMC has the capability of efficiently managing large workloads of material release orders (MROs). To exploit the IMC's efficiency, this analysis evaluates all items managed by the Defense Logistics Agency for storage there. The goal is to bring the IMC's workload up to a level between 2.5 and 3.0 million yearly MROs while limiting its storage to 85% of capacity. Conclusions and recommendations are to (1) accept the list of items found; (2) use a buy-back policy for replenishment items with high yearly MROs; and (3) consider a redistribution implementation policy for National Stockage Objective (NSO) items and replenishment items with low yearly MROs, especially those items at Base Realignment and Closure (BRAC) sites.

DLA-94-P10227. Results And Implications For Phase I of the USAF
Index No. 94-03 Wing Commanders Flexibility Test (Local Versus
Central Purchase)

This project evaluated test results of the USAF Wing Commanders' Flexibility Program (1st phase only) from a system level perspective. This test (which is being conducted under two phases) was initiated by USAF to enhance the Wing Commanders' acquisition options for meeting mission requirements by expanding the use of local purchase. The first phase of the test covered the time period of October 1991 through September 1993 and was restricted to consumable items for base support, equipment and vehicles (excluding weapons, flight, and space systems). This review looks at the test results from a DoD

perspective and takes into account the objectives of the on-going National Performance Review. Significant findings were that local purchases could be received by the air bases participating in the test faster than from the central system but this quicker service was obtained at a greater cost. Additionally, it was found that approximately twenty percent of the items purchased under the test had some type of product specification or technical drawing requirement. Consequently, manpower costs would be incurred to confirm product conformance to specifications.

DLA-94-P10085. Zero Demand Retention Limits (Aug., 1994)
Index No. 94-02

The results of this study show that retention limits can vary considerably depending upon the holding and disposal cost factors used. The retention limits were determined using a cost model that calculated the five year cost of both holding and disposing of zero demand stock while still meeting expected demands. The model demonstrated that holding costs are generally favored over disposal and reprourement costs until the probabilities of demand become so low that the cost of reprourement is less than the cost to hold. The study also showed that the retention limit was sensitive to the net disposal rate which was probably the most uncertain of the cost factors used in the study. Given the uncertainty in the cost factors, and the overall risk in terms of cost and potential customer support degradation, the study recommendation is to stay at a general five year retention limit for all commodities and reevaluate the policy after a study is conducted to determine the actual net disposal rate.

DLA-94-P00113. Development of a New DLA Sourcing Model (Sep., 1994)
Index No. 94-01

At DLA's 1992 fall Commanders Conference, the Director stated that he wanted the following six things: the ability to do warfighting assessment; to know what our war stoppers are; to know when we are going to run out of stock in various contingency operations; to know the weapons systems affected; to know how our ability to support will impact the warfight; and information on which we can base investment decisions. The Director's address spawned multiple initiatives, one of which was an enhancement to the Rapid Response Mobilization Indicator (RRMI) model and another was the development of a new DLA sourcing model now called the DLA Asset Sourcing and Sustainment Model (DASSM). RRMI was designed/enhanced to provide agency-wide assessments of projected capabilities and shortcomings in meeting contingency requirements. CAIL, with input from DORO, decided that DASSM should include some of RRMI's capabilities, the primary one being the ability to simulate the reordering process (procurements). This project was initiated to develop DASSM as the new sourcing model for DLA and to incorporate aspects of RRMI into it.

DLA-93-P30256. An Economic Analysis Of Alternatives For Converting
Index No. 93-49 Engineering Drawings For The Engineering Data Management
Information And Control System (EDMICS)

Approximately 2.6 million active engineering drawings are stored on aperture cards in Engineering Drawing Automated Storage and Retrieval Equipment (EDASRE) at four Defense Logistics Agency (DLA) supply centers. It was decided to convert storage of these drawings to optical disk media in the Engineering Data Management Information and Control System (EDMICS). The EDMICS economic analysis showed that conversion from EDASRE to EDMICS will result in significant benefits. This economic analysis examined five alternative methods of making the conversion.

DLA-93-P30223. Analytical Support to the Office of Federal Procurement
Index No. 93-48 Policy for Workload Modeling

This report outlines the analytical support provided to the Office of Federal Procurement Policy (OFPP) task force studying Civilian Agency Contract Administration (CiviCAS). The task force collected contract administration data from the Defense Contract Management Command and 23 civilian agencies. From this data we developed a workload model for the civilian agencies. This model aided the OFPP lead task force in evaluating alternative contract administration strategies for the civilian agencies.

DLA-93-P30156. Warfighting Assessment Analysis and Enhancement
Index No. 93-47

The purpose of this project was to address the Director of DLA's need for enhancing the Agency's capability to conduct supportability assessments of various warfight scenarios. The Director wanted to insure that the Agency possessed the ability to identify time-phased inventory shortfalls, weapon systems that were "at risk" due to inventory shortfalls, and investment costs needed to meet the Services' material requirements during both Joint Strategic Contingency Planning (JSCP) deliberate planning process and various crisis-action related scenarios. DLA's Operations Research Office (DORO) proposed enhancements to the Rapid Response Mobilization Indicator (RRMI) model and the development of post-processor programs to meet the Director's objectives. DORO completed the RRMI model enhancements, the required post-processor model development, and demonstrated the model's capabilities by performing supportability assessments of two actual Operation Plans (OPlans). One OPlan supportability assessment was briefed to the DLA Director, and presented at the DLA's Commander's Conference. The Director approved the use of the model for future warfighting assessments. DORO conducted a cursory investigation of the Military Services' capabilities to generate time-phased wartime/contingency operations material requirements, and discovered that all of the Services' have the capability to generate requirements but the degree of capability varies. The number of DLA managed items identified by the Services in specific OPlans is limited. It is recommended that DLA sponsor a wartime material requirements generation workshop with the Services in order to obtain a more complete picture of the Services' capabilities to generate wartime material requirements. As a result of this analytic effort, the majority of the Director's warfighting needs have been addressed, with the

DLA-93-P30138. Statistical Sampling Techniques for Contractor Purchasing
Index No. 93-46 Systems Reviews (CPSRs)

DLA-93-P30135. An Economic Analysis of the DLA Executive Information
Index No. 93-45 System

DLA-93-P30105. Contract Management Paperless Automated Support System
Index No. 93-44 (COMPASS) and Automation of In-Plant QAR Records
(AUTOQAR) Economic Analysis

29

DLA-93-P30085. Analysis of ODS vs TPFDD Data
Index No. 93-43

This project was initiated to assess the adequacy of DLA identified OPLAN requirements by comparing a specific time phased force deployment (TPFDD) process with actual support provided during Operations Desert Shield/Storm (ODS). The purpose was to identify items which are potentially underestimated or overlooked, and to provide visibility of the shortfall for comparison between a real war and a planned exercise. The top ODS NSNs by quantity were provided for management review. Graphs were also provided to show actual (ODS) and planned (TPFDD) demand and shipped quantity, frequency, dollars, weight, and cube by class over time.

DLA-93-P30057. Quality Assurance Resource Model (QUARM) Implementation
Index No. 93-42

The QUARM equations use regression analysis to identify and quantify logical workload indicators that have statistically valid correlations with the corresponding workload. This project implements these equations by extracting the necessary data from three databases on the DLA minicomputer and using this data to automatically create a spreadsheet. The user is only required to download an ASCII file from the Distributed Mini System (DMINS) and invoke an Enable 4.0 macro to generate the spreadsheet containing six month average QUARM results. Now QUARM can be used for its intended purpose: to provide a uniform, analytical approach (along with other analyses or field reviews) to balance QA resources.

DLA-93-P30054. DCMC Data Validation Filter
Index No. 93-41

This report documents the development and application of a computer based data validation tool for use by the Defense Contract Management Command (DCMC). The model is based on Statistical Process Control (SPC) principles combined with Single Exponential Smoothing (SES) forecasting. Monthly data values that are statistically unusual compared to historical values are flagged for review and possible correction. This kind of model is necessary for the effective implementation of the unit cost based resourcing system. Inaccurate unit cost system data will result in inappropriate workload and resource assessments. This model should eventually be used to validate a much wider array of key management data at the DCMC, Secondary Level Field Activity (SLFA) and District levels.

DLA-93-P30039. Depot Configuration Analysis
Index No. 93-40

This study was undertaken to provide analytical assistance to a contractor, CACI, in developing a distribution concept of operations for use in the FY 93 BRAC process. To assist in examining multiple configurations, we first obtained and examined the throughput and storage space capability of each site. Projected reductions in capability due to deterioration in buildings, previous and projected minor satellite site closures, and projected increases

due to MILCON had to be integrated in the capability assessment. Future requirements included reductions due to force drawdowns, inventory reduction initiatives and movement of material from Europe. Differentiation between active and inactive cube was also made. Comparisons between requirements and alternative configuration capabilities were made using a spreadsheet tool. Sensitivities on length of work week, percent of cube required to support active items and effectiveness of inventory reduction were also accomplished.

DLA-93-P30030. Regional Freight Consolidation Center Break-Even Model
Index No. 93-39

The volume of vendor freight flowing through the Regional Freight Consolidation Centers (RFCCs) has been steadily declining. In Fiscal Year (FY) 90, the volume was 54 million pounds, but in FY 92 the volume was 37 million pounds. Because of this decline, the Defense Logistics Agency (DLA) Materiel Management/Transportation Services Team required information on the minimum freight level required for an RFCC to remain cost effective. Also, information was needed to gain insight on the effect of changing transit time policy on an RFCC's cost effectiveness.

The objectives of the study were to determine the approximate tonnage at which an RFCC's transportation cost equals the transportation cost of direct shipment and to quantify the impact on RFCC transportation savings of changing transit time policy for traffic lanes.

The study is based on 1 year's data (FY 92) from the RFCCs' history files. The scope of the study was limited to vendor freight consolidation operations at the five commercial RFCCs. Traffic lanes were restricted to those routes between the RFCCs and the six traditional DLA depots.

Conclusions of the break-even analysis were that the transportation cost break-even occurs when an RFCC's annual freight total falls in the following respective range: 2.6 to 4.1 million pounds (lbs) for Chicago, IL, .8 to .9 million lbs for Dallas, TX, 1.8 to 2.3 million lbs for Jacksonville, FL, and 6.0 to 7.5 million lbs for New York, NY. The Los Angeles, CA, RFCC appears to be beyond its break-even range and to be losing a small amount of transportation dollars annually. This result is attributed to the relatively high outbound cost of the Los Angeles site in comparison to the outbound cost of other RFCCs. Conclusions of the transit time policy analysis included the following. Changing hold time policies would only lead to a small increase in transportation savings at the following RFCCs: Chicago, IL, Dallas, TX, Jacksonville, FL, and New York, NY. Several lanes associated with these RFCCs were estimated to be losing money even after consolidation time had been increased to 10 days. Increasing hold time to 8 days for the Los Angeles RFCC was found to produce a savings on lanes that otherwise were estimated to be losing transportation dollars.

Recommendations were to use the results of the break-even analysis as a management indicator to estimate when operation of an RFCC may no longer be cost effective. Other recommendations included not to change transit time policy at the following RFCCs: Chicago, IL, Dallas, TX, Jacksonville, FL, and New York, NY. But it was recommended to negotiate for lower rates for those lanes that did not show a transportation savings after 10 days of

DLA-93-P30029. Unauthorized Materiel Returns
Index No. 93-38

The study investigated four types of unauthorized returns, and identified returns by each military service or civilian agency. The number of returns creating excess stock on hand and the number of returns resulting in disposals were also examined. From a statistical standpoint, the percentage of unauthorized returns for each category was fairly small. The greatest problem was in returns of materiel in excess of the amount authorized, accounting for 7.11 percent of authorized receipts. No single customer group could be identified as the primary cause of unauthorized returns; the Military Services accounted for the greatest number of unauthorized returns, but the percentage of error within each service was small. Some other customer groups had significant error rates but submitted only a few returns to DLA. The project concluded that some reduction in unauthorized returns may be achieved through more stringent inspection of materiel by the customers prior to return, but that overall, the costs of singling out specific commands responsible for errors may outweigh the potential benefits.

The DLA Future Inventory Control Point (ICP) Realignment Support Team investigated the feasibility of reducing the number of DLA Supply Centers. Many alternative configurations of consolidating the six supply centers plus two service centers were explored. Based on analyses done under this project, it was shown that maximum savings occurs when all activities are consolidated into a single organization. Based on these analyses, along with a risk assessment, DLA FIRST concluded that the merging of five supply centers and two service centers into a consolidated ICP was preferable to a dual ICP configuration. This plan, briefed to the Under Secretary of Defense and Congressional staff, showed the potential net savings over twenty years could exceed \$2.5 billion in 1992 dollars.

The DLA Future Inventory Control Point (ICP) Realignment Support Team investigated the feasibility of reducing the number of DLA Supply Centers.

Many alternative configurations of consolidating the six supply centers plus two service centers were explored. Based on analyses done under this project, it was shown that maximum savings occurs when all activities are consolidated into a single organization. Based on these analyses, along with a risk assessment, DLA FIRST concluded that the merging of five supply centers and two service centers into a consolidated ICP was preferable to a dual ICP configuration. This plan, briefed to the Under Secretary of Defense and Congressional staff, showed the potential net savings over twenty years could exceed \$2.5 billion in 1992 dollars.

DLA-93-P20355. Customer Information Report
Index No. 93-35

This is a data extraction effort in support of the Inventory Control Point (ICP) Customer Assessment Program. An ICP Corporate Customer Assessment Team was charged with determining customer focus groups to be surveyed to assess customer satisfaction. Requisition history information available in the Defense Logistics Agency (DLA) Integrated Data Bank can assist in identifying specific customer groups which may be targeted in this assessment. The study identified 11 customer groups such as Army, Navy, Air Force, etc., which can be easily identified by Department of Defense Activity Address Codes (DoDAAC). Customers were ranked within each group by average annual number of requisitions submitted, and by annual average dollar value of requisitions submitted. Customers for each commodity were also ranked by these criteria.

The study found that individual DoDAACs were too small to be utilized as focus groups. DLA's largest customer accounted for only 1.77 percent of sales by dollar volume indicating that there are no distinct high volume customers that can be singled out as focus groups. Customers within the 11 customer groups were too dissimilar to allow a focused study of customer satisfaction. The report recommended that a mid-level definition of DLA's customer be established by the ICP Corporate Customer Assessment Team, either through further manipulation of the DoDAAC or through subject matter expertise.

DLA-93-P20342. Freight Cost Comparison Between QUICKTRANS and the
Index No. 93-34 Guaranteed Traffic Program

In March 1992, the Defense Logistics Agency (DLA) was directed to assume management of the Service depots. In May 1992, representatives from DLA, Naval Supply Systems Command, and the Naval Material Management Transportation Office (NAVMTO) met in Norfolk, VA, to discuss the most cost effective means of moving cargo from the service depots. One of the principal issues became the cost effectiveness of the QUICKTRANS (QT) program in comparison to the cost effectiveness of the Guaranteed Traffic (GT) program.

The purpose of this study was to determine which system, QT or GT, provides the least overall transportation cost to the Department of Defense. The scope of the study includes all high priority air shipments originating at the QT service point of Travis AFB during a 3-month period. Data for the study was provided by NAVMTO from their monthly billing tapes.

The cost calculation for GT included both transportation cost and Government Bill of Lading cost. The cost calculation for QT included surface transportation cost inbound to the QT origin service point and the transportation cost from the QT origin service point to the customer.

Results of the cost calculations and accompanying sensitivity analyses showed that GT was more cost effective than QT. GT is estimated to produce a savings in the range of \$135,000 to \$287,000 quarterly for high priority air shipments originating at Travis AFB.

DLA-93-P20340. Forecasts of Defense Contract Management Command (DCMC)
Index No. 93-33 Unit Cost Products/Services

This report presents forecasting methodologies for each of the 18 unit cost products/services currently used by DCMC. All of the forecasts save one are based on the following: DoD Procurement outlays, DoD Research, Development, Test & Evaluation (RDT&E) outlays, or the sum of both. The forecast for the terminations unit cost count was based on dockets opened the previous year. Where possible, the outlays from the previous year were used to recognize the lag between the budget and DCMC workload. Forecasts were prepared for Fiscal Year 1994 for each of the unit cost indicators.

DLA-93-P20296. Organizational Modeling Programs Enhancement
Index No. 93-32

The Organization Modeling Program (OMP) is an interactive microcomputer model designed to provide fast access to position and employee information frequently requested by management. Its primary functions are to retrieve and report activity information based on any combination of several criteria, and to model current and proposed organization structures. In addition, OMP provides features to maintain the several files and tables which it uses.

DLA-93-P20291. Support for the Defense Contract Management Command (DCMC)
Index No. 93-31 5 Year Resourcing Plan

This project developed a model to project DCMC's 5 year staffing requirements. It uses as input changes in DCMC's external macro level workload drivers. These drivers were identified for this model as DoD procurements, RDT&E funding, and defense contractor staffing levels. The model has fixed and variable staffing components. It makes projections, at the district level, for both Management Area Offices (MAOs) and Plant Representative Offices (PROs).

DLA-93-P20278. Technical Support for CIT Red Flag Model
Index No. 93-30

The Red Flag Model is a computer simulation of key Defense Logistics Agency (DLA) supply center processes and backlogs. The model was developed to provide visibility of potential supply center workload problems which were expected to develop as a result of the transfer to DLA of approximately

800,000 items, previously managed by the Military Services. The Red Flag Model is so named because measurement of each process or backlog is accomplished through the use of indicators which track the entire range of operating levels from normal to out of tolerance (i.e., red flag) levels. The model was developed and installed at the four DLA hardware supply centers under project DLA-93-P10163. Because the model is designed to predict potential problems from 4-6 months in advance, model inputs must be periodically reviewed and updated. Therefore, the purpose of this project was to provide required updates and other technical support to the model users.

DLA-93-P20258. Statistical Sampling for Property Management
Index No. 93-29

This report documents the calculation of two new property sampling plans at the 95% and 97% confidence levels. These plans contain the sample size and number of defects permitted to reject lots of 10% or more defects with the specified confidence. The report also addresses how much property-to-records sampling is required to maintain the currently prescribed 90% level of confidence of rejecting lots with 10% or more defects. A full sample of property should be taken to check against records in order to maintain the desired level of confidence.

DLA-93-P20253. Defense Logistics Agency Laboratory Testing
Index No. 93-28 Return On Investment Model

This report represents an initial effort to develop a sound approach for measuring DLA's return on its investment in its laboratory testing program. It provides a way of measuring both investment (costs incurred) and quantitative indicators of return (savings and costs avoided) broken down by supply center and in-house laboratory. It also provides initial measures of investment and return based upon data for FY 92. Investment is estimated to be about \$12 million. Quantitative estimates of return are \$36 million. Qualitative indicators of return are far larger. Thus, the total return on investment in laboratory testing is highly favorable.

DLA-93-P20248. Automated Best Value Model (ABVM) Implementation
Index No. 93-27 Assessment

A prototype model to evaluate a contractor's past performance was developed for use in bid evaluation. The prototype was developed for use at Defense General Supply Center (DGSC). Prior to extending the model to other Defense Logistics Agency centers, an assessment of the model by DGSC users was desired. This project was established to allow the model developers to provide support to the DGSC assessment team during the test period. Support included running the model upon demand and providing raw input transaction data to the team for evaluation and correction.

DLA-93-P20210 / DLA-93-P10174.
Index No. 93-26

**DMRD 903 Size Reduction Distribution Cost
Analysis**

The purpose of this project was to determine the effect on the distribution cost of the DMRD 903 size reduction initiative. The project analyzed the 3 year workload activity of those items that were selected for size reductions in order to develop the warehouse and transportation costs. This workload was then compared to the probable ordering pattern that would have been followed if the sizes were not available for ordering. The resulting difference in costs for the two ordering patterns represented the most favorable cost offsets for the size reduction initiative which the Defense Logistics Agency (DLA) could expect.

DLA-93-P20196. Hazardous Material Vendor Stability
Index No. 93-25

This study was undertaken as a preliminary analysis to a broader study on the stockage policy for hazardous items. The broader study was to examine whether a closest-to-vendor or a closest-to-customer policy was more cost effective for hazardous material.

The objectives of this study were to familiarize ourselves with the hazardous material data and more importantly to determine whether a multiyear model would be required in the broader study. One critical issue in assessing the requirement for a multiyear model was the stability of the vendors for hazardous material. Geographical stability would indicate that a multiyear model was not necessary since the source of material did not change from year to year.

The analysis examined on an individual item basis the fluctuation of vendor from region to region. The conclusion was that seventy two percent of the material on a throughput cube basis experienced vendor region shifts. Thus a multiyear model certainly is recommended for the follow-on study.

DLA-93-P20176. Forward Pricing Rate Agreement (FPRA) Feasibility Study
Index No. 93-24

This study found that an analytical model could be developed that would enable more FPRAs to be done with the same resources. Such a model would semi-mechanize projections and would enable price analysts to do them more effectively, efficiently and accurately. A universal model is viable for the part of the FPRA analytical process that projects costs at either the account or summarized account level. This is because contractors have many of the same types of costs (before allocation), and the costs usually have the same cost drivers. The study found that it would not be feasible to build a universal model to allocate the projected costs to cost centers because organization and cost center structures vary widely between contractors. The model proposed by this study would include techniques for adjusting for seasonality and inflation as well as forecasting methods such as regression, simple moving average, and exponential smoothing. The model would also incorporate automated validity tests.

DLA-93-P20159. Comparative Cost and Support Pattern Analysis for High
Index No. 93-23 Demand Navy Customers Under a Single Site Storage Option

This report details results of a comparative cost analysis conducted to assess the relative cost differences due to single siting of stock at selected DLA and Navy storage sites. Additionally, all vendor and customer service patterns, which would result from single siting of stock, were identified. These patterns were identified in order to provide insight on the resulting business distributions which would need to be supported from each site. This study has included actual Navy retail level data in addition to DoD wholesale data. Inclusion of retail data has had a significant impact on study results. A major constraint on the study is that capacity limits at the selected storage sites were not considered. Study results indicate that the two largest Navy support areas (Norfolk and San Diego) offer significant potential for materiel distribution savings since those two locations have both a large local (within 50 miles) customer base and are well positioned with respect to vendor locations.

DLA-93-P20147. Red River Depot Operations Center Design Simulation
Index No. 93-22 Analysis

The Depot Operations Support Office (DOSO) designed the blueprints for a Depot Operations Center (DOC) to be built at DLA's Red River depot. The DOC will consolidate the currently dispersed areas of receiving, packaging and preservation, storage, and packing and shipping. This analysis evaluates DOSO's design for impediments and inefficiencies when subject to a simulated dynamic environment. Overall, results showed a system that was well designed but could use design improvements in some areas. For the receiving and towveyor areas, improvements are minor. The receiving area could benefit by reallocating certain personnel and insuring quick pallet off-loads after inspection. Additionally, increasing the length of some spurs would allow the towveyor to operate more efficiently. However, the preservation/packaging and packing/shipping areas could use more extensive design changes. The preservation/packaging area requires more vacuum bag machines, package stations, and pallet lines. In addition, this area could profit by either enlarging existing incheck stations and spurs, installing additional incheck stations for both the pallet and tote lines. For the packing/shipping area the pallet rack backlog spur and the pack-sort work station would operate more efficiently by using some combination of insuring additional personnel to work these spots as needed, enlarging the existing spurs, installing additional spurs, and/or controlling the arrival of material. Furthermore, packing/shipping would improve by keeping the mix of lines in the less-than-truckload section flexible and insuring the computer software governing the carousels give precedence to off-loading completed shipping units over on-loading of newly arrived material.

DLA-93-P20130. PDS Location Study With Closest to Vendor Stock Policy
Index No. 93-21

Under the DMRD 902 initiative, DLA has proposed operating the distribution system using a Primary Distribution Site (PDS) Concept. The essence of the PDS concept is to have a few number of sites provide the great majority of

wholesale issue capability. The remaining sites within the thirty site network would provide specialized support to maintenance and retail level support. In this project, we performed an analysis of how many sites should be designated as primary sites and which specific sites they should be under a closest-to-vendor stockage policy. Cost was to be the decision criteria. The areas of cost addressed in the study were transportation cost and issue processing cost.

Two key assumptions that influenced the total processing cost were the closest-to-vendor stockage policy and the use of a generic unit processing cost. The same "generic" unit costs for processing an issue were used at all sites. The same was true for processing a receipt. Also, the closest-to-vendor stockage policy meant each item was stocked at only one location. The cumulative effect of the two assumptions was that total processing cost does not depend on the specific PDS configuration. Hence, transportation costs alone determined the low cost configuration.

The main conclusion of this study was that, although a six PDS configuration gave the lowest cost, differences between other configurations were so small that transportation costs alone were considered insufficient to select the "best" PDS configuration. The study recommends that an obvious discriminator between sites, the cost for processing an issue or a receipt, should be further studied. Defendable, auditable processing costs for each specific site should be developed to assist in making these site selection decisions.

DLA-93-P20115. Defense Distribution Region Central Regional Freight
Index No. 93-20 Consolidation Center Simulation

This is an analysis to determine if the DDRC RFCC located at Defense Distribution Depot Memphis, Tennessee (DDMT), can accommodate increases in throughput and workload by expanding its local customer area to include pooled freight destined for the South Central RFCC region (Texas, Oklahoma, Kansas, and New Mexico). This analysis only addresses the movement of freight and the processes critical to movement of freight through the mechanized RFCC. Factors such as cost effectiveness, equipment malfunction, or indirect workload are not included.

A simulation model was used to determine if the DDRC RFCC can accommodate increases in throughput and workload by expanding its local customer area. The results of the simulation revealed three factors that significantly impact the flow of material through the RFCC. They are the pallet unitization workstation process times, the size of the pieces flowing through the RFCC, and the number of pieces placed on a pallet at the pallet unitization stations. Any problems encountered with the flow of freight through the RFCC caused by the unitization workstations can be accommodated through policy changes and should not hinder expanding the local customer area to include the South Central region. Piece size and number of pieces per pallet are two factors which are dependent on one another. With the RFCC still in a testing phase, accurate data is not yet available for these two factors. Since these factors are not adaptable to policy changes within the freight terminal, actual piece size and number of pieces per pallet should be verified before a final decision is made to include the South Central RFCC region.

Based on analysis of available data and sensitivity analysis, with respect to the piece size and number of pieces per pallet, we recommend including the South Central region as part of the RFCC local customer area if the average piece size is 1 foot or less and the average number of pieces per pallet is greater than 10. We do not recommend including the South Central region if the average piece size is 2 feet or greater and the average number of pieces per pallet is 5 or less. If the average piece size is between 1 and 2 feet and/or the average number of pieces per pallet is between 5 and 10, we recommend that the simulation be rerun and the results be used as a basis for determining whether the South Central region should be included as part of the RFCC local customer area.

DLA-93-P20113. Annual Materials Plan Analysis Tool II (AMPAT-II)
Index No. 93-19

AMPAT-II is a personal computer based analysis tool developed for use by the Defense National Stockpile Center (DNSC) to model decision processes that precede computing an Annual Materials Plan (AMP). Per public law, the President submits the AMP to Congress and in it proposes inventory changes to the Defense National Stockpile. AMPAT-II computes how much can be sold of a commodity on international markets and passes its results to AMPAT-I (project DLA-93-P10218) which uses mathematical programming to compute a 10-year AMP.

To determine these market limits, AMPAT-II uses a rule that evolved over many years and has proven to be politically and economically acceptable. This rule, authored by a newly-retired DNSC expert, needs many preliminary computations and decisions to be made, the most difficult of which is determining production relationships among materials. AMPAT-II addresses this matter by constructing complex production rules from simple production relationships entered by the user. AMPAT-II was created using the artificial intelligence language PDC-PROLOG and the procedural language TURBO C++.

DLA-93-P20096. Army Direct Support System (DSS) Analysis
Index No. 93-18

This is an analysis of the United States Army Direct Support System (DSS) performance standards to determine the impact of applying those standards to DSS shipments originating at Defense Logistics Agency (DLA) managed supply depots. The analysis is limited to the six traditional DLA supply depots located at Mechanicsburg, PA, Columbus, OH, Richmond, VA, Memphis, TN, Ogden, UT, and Tracy, CA.

A simulation model was used to determine the estimated cost and operational effectiveness associated with four different scenarios; (1) the current method of operations or BASELINE, includes depot processing at the Issue Priority Group (IPG) 3 level and shipping surface freight, (2) depot processing at the IPG 3 level with second day air transportation for destinations over 400 miles and surface transportation for destinations 400 miles and under, (3) depot processing at the IPG 1 level and shipping surface freight, and (4) depot processing at the IPG 1 level with 2nd day air transportation for destinations over 400 miles and surface transportation for destinations 400 miles and under.

It was recommended that DLA maintain the level of service currently provided to Army DSS customers. While the approach does not meet current DSS standards, it is equivalent to the performance of former Army depots prior to DLA ownership. As a no cost alternative, the Army should consider adjusting DSS objectives to match present performance. One additional method for processing DSS material was proposed which would reduce order-ship-time to meet the DSS standards but would significantly increase DLA's depot and transportation costs.

DLA-93-P20093. Cash Flow Forecasting
Index No. 93-17

This report documents the development of the Cashflow Forecasting Model (CFM) that is both easy to use and easy to understand. This spreadsheet-based model uses mostly conventional, textbook estimating techniques to forecast a one-year-ahead cash flow from contractor financial statements and a minimal number of contractor projections. Default values are suggested if the contractor cannot make the few projections required. It is recommended that the CFM be used DCMC-wide to help price analysts use Cashflow Forecasting during Preaward Surveys and Postaward Analyses of a contractor's financial capability.

DLA-93-P20082. Contractor Purchasing System Review (CPSR) Model
Index No. 93-16 Enhancements

This study was required in order to modify the CPSR model to conform with recent changes in the Public Laws and regulations regarding Purchasing Reviews. Additional enhancements were also incorporated into the model based on requests from DCMC HQ and field level users. A graphical analysis module was added to help field analysts spot emerging trends and potential problem areas during reviews.

DLA-93-P20058. Development of a DLA Market Basket
Index No. 93-15

The DLA Market Basket model is an analytic approach for measuring DLA's performance of providing wholesale supply support to its customers. This approach closely follows that used by the U.S. Department of Labor, Bureau of Labor Statistics in developing the Consumer Price Index. The Market Basket is a representative sample of the population of items managed by DLA developed using stratified sampling techniques. From this sample of items, data are collected and four performance indicator values are computed. The indicators measure the rate of change in the Basket's four performance measurement areas over time. The four measurement areas are: Price, Sustainability, Availability, and Quality. Each performance area is measured by a mathematical rate equation. These equations are composed of several related data elements. DLA management can use these indicators to measure and track supply support performance over time. Analysis of the supporting data, also generated by the model, can be used to explain the indicator values and to isolate areas where business improvements may be needed.

DLA-93-P20047. Industrial Base Program Item Selection Indicator
Index No. 93-14 Analytical Enhancements

The purpose of this project was to enhance the Item Selection Indicator (ISI) model and adapt it for use on sector studies. The project resulted in a Sector Selection Indicator (SSI) model which builds on the ISI model. The SSI prioritizes industrial sectors for further study based on aggregate ISI values, Operation Desert Storm demand data, backorders, depth of vendor base, degree of foreign dependence, and a number of other critical factors. The model can be used to prioritize federal supply classes at each Defense Logistics Agency Supply Center for in-depth analysis.

DLA-93-P20042. Corporate Quality Effectiveness Sensing Technique (QUEST)
Index No. 93-13

The DLA Operations Research Office (DORO) has completed this project to update and enhance the Quality Effectiveness Sensing Technique (QUEST) model. The new version of QUEST was required due to changes in the Quality Assurance Management Information System (QAMIS) from which QUEST extracts most of its source data. Version 4.0 also takes advantage of new information available in the QAMIS pertaining to types of Waivers and Deviations. Also included in this version is a method for compiling a composite corporate score for major contractors with more than one Contractor and Government Entity (CAGE) code.

DLA-93-P20004. Depot Consolidation Workload Transition Analysis
Index No. 93-12

Under the DMRD 902 initiative, DLA has proposed operating the distribution system using a Primary Distribution Site (PDS) Concept. The designed implementation of the PDS concept is to have three sites (San Joaquin, Susquehanna, and Memphis) provide the great majority of wholesale issues capability. The remaining sites within the thirty site network would provide specialized support to maintenance and would provide retail level capability. In this project, we provided yearly projections of issue workload for major sites based on a transition plan that involved a closest-to-vendor stockage policy and movement of work through attrition of assets rather than by redistribution. Projected impacts on overall workload based on force drawdowns was integrated into the analysis.

The analysis indicated that Susquehanna was the only primary site that would see any significant increases in workload in the five year outlook. For Susquehanna, their current workload would increase by 80 percent over the timeframe. For the other PDS sites, workload actually decreased slightly. In addition, at some of the specialized sites such as Ogden, significant levels of workload remained throughout the five year period. The analysis provided these projections for transition planning purposes and indicated that if the workload trends were too slow, redistribution actions, redirection of current in process procurements and redirection of returns should be explored further. These alternatives could be costed out in future studies.

DLA-93-P10237. Analytical Enhancements to Property Control System Analyzer
Index No. 93-11

The Property Control System Analyzer (PCSA) model is designed to assist property administrators (PAs) perform analyses. The model is a series of computer programs, data bases, and stored knowledge about property analysis procedures which provide informed assistance. The model acts as a guide through the data collection process and offers a series of screens which provide the PA guidance with respect to timeframes, documentation, and specific Federal Acquisition Regulation requirements. It automatically determines the status of an analysis based on the Department of Defense Property Manual sampling plan. It also prints out working papers from the analysis when necessary. The purpose of this guide is to familiarize PAs with the model. It does not supersede formal guidance in the Department of Defense Property Manual. This guide shows how to install the model and define system requirements. It discusses the various data files created and shows how to use the menu options.

DLA-93-P10228. Direct Shipments to Overseas Customers
Index No. 93-10

This study documents a review of DLA's capability to "source load" cargo containers for direct shipment to overseas customers. "Source loading" is defined as loading a cargo container with enough freight to generate a Container Load (CL) at a single shipper location destined to a single customer. The CL is then taken directly to the port of embarkation (POE) for shipment to the customer, bypassing Container Consolidation Point (CCP) processing. The study included freight generated at DLA, Army (now under DLA management), and GSA supply depots during an 18 week timeframe. Former Air Force, Navy, and Marine supply depots were not reviewed because the requisition data for those depots were not available at the time of the study.

The study concluded that DLA shows little potential for source loading for direct shipment to overseas customers. This appears to be based on the fact that DLA stocks and distributes materials from multiple facilities with many facilities shipping to the same customers on a regular basis. Conversely, GSA has the greatest potential for source loading. This appears to be based on the fact that GSA stocks and distributes supplies from two primary facilities, one on the east coast and one on the west. The GSA facilities at Belle Meade, NJ and Rough and Ready, CA have the potential to source load 17 of the 18 potential source load customers identified. An additional analysis showed that these 17 customers accounted for approximately one third of the total weight originating from all of the GSA locations for the customers evaluated.

Recommendations were made that (1) Direct source loading to the overseas customers from the DLA depots should not be considered at this time, (2) DLA should reevaluate "source loading" should a policy of Primary Distribution Sites (PDS) be adopted, (3) a follow-on analysis should be conducted to determine which customers could be clustered/grouped efficiently around an overseas central Supply Support Activity or Break Bulk Point to more efficiently stuff container load or large less-than-container load shipments at the CCPs, (4) GSA shipments should be evaluated further to determine if any monetary savings accrue through "source loading" versus shipping through the

CCP, and (5) former Air Force, Navy, and Marine supply depots should be evaluated to determine if there is a potential for "source loading" to overseas locations once data become available.

DLA-93-P10218. Annual Materials Plan Analysis Tool (AMPAT)
Index No. 93-09

AMPAT is a personal computer based analysis tool that the Defense National Stockpile Center (DNSC) will use to build the Annual Materials Plan (AMP). Per public law, the President submits the AMP to Congress and in it states how much of what materials to modify in the Defense National Stockpile. AMPAT allows the user to create and maintain many commodity and financial information databases. These databases can be freely paired to construct an economic/political scenario for which an AMP is computed and solved using linear programming. AMPAT allows the DNSC to swiftly respond to the frequent and urgent taskings from the Assistant Secretary of Defense (Production and Logistics) for new AMPs, taskings often generated by Congressional actions. AMPAT reduces the time used to compute the AMP from one week to one hour and thus accelerates feedback between OASD/P&L and the DNSC. AMPAT was created using the artificial intelligence language PROLOG and the procedural language TURBO C++.

DLA-93-P10198. Processing Cost for Duty-free Entry Certificates
Index No. 93-08

This report documents the costs for the processing of duty-free entry certificates by the Defense Contract Management Command International, International Logistics Office (DCMCI-I) for imported defense goods. It also addresses potential alternative methods for achieving the goals of the program. Since payment of duties by the Defense Logistics Agency to U.S. Customs would be payment from one government agency to another, consideration was given to alternatives that involve paying, rather than avoiding, certain duties. However, the major policy changes that would be required to implement such a program probably are not feasible. At a minimum, a threshold should be used to pay duty on shipments with a value under \$1,160. The duty on these shipments is less than the \$33 cost to process a duty-free certificate. Also, the Mechanization of Contract Administration Services (MOCAS) computer system should be modified to allow users to input item descriptions and get one or more possible tariff codes. Clerks must often look-up tariff codes for military-consigned shipments in large Customs manuals. Combined savings from a threshold and the system modification would be approximately 4 workyears.

DLA-93-P10174 / DLA-93-P20210. DMRD 903 Size Reduction Distribution Cost
Index No. 93-07 Analysis

The purpose of this project was to determine the effect on the distribution cost of the DMRD 903 size reduction initiative. The project analyzed the 3 year workload activity of those items that were selected for size reductions in order to develop the warehouse and transportation costs. This workload was then compared to the probable ordering pattern that would have been followed if the sizes were not available for ordering. The resulting difference in

costs for the two ordering patterns represented the most favorable cost offsets for the size reduction initiative which the Defense Logistics Agency (DLA) could expect.

DLA-93-P10163. Forecasting Consumable Item Transfer Impacts
Index No. 93-06

The transfer of management of nearly one million consumable items from the military services to the Defense Logistics Agency (DLA) during the period FY91 - FY94 may adversely affect certain key processes and backlogs at the four DLA hardware supply centers. Specifically, "bottlenecks" or "choke points" could develop within the four hardware centers as a result of overtaxed resources. Therefore, the DLA Operations Research Office (DLA-DORO) has developed a computer simulation of these key supply center processes and backlogs. The Red flag Model is so named because measurement of each process or backlog is accomplished through the use of indicators which track the entire range of operating levels from normal to out of tolerance (i.e., red flag) levels. Furthermore, the model enables the hardware centers to identify potential problem areas 4 to 6 months in advance and take appropriate corrective actions. The model is currently installed at each hardware center.

DLA-93-P10141. Los Angeles Regional Freight Consolidation Center Pool
Index No. 93-05 Distribution Update to DLA-91-P00258

This study, requested by the Regional Freight Consolidation Center Program Office, is the fourth in a series of analyses of pool operations at Los Angeles. The Los Angeles Regional Freight Consolidation Center (RFCC) is the only site at which pool operations have been implemented. The scope of the study is based on 1 year's data for the period May 91 through April 92; the analysis focuses solely on pool operations.

The study concluded transportation savings for the period was in the range of \$93,595 to \$140,512. As the DLA-managed service depots implement their own respective Guaranteed Traffic Programs, the savings level will be more closely represented by the lower part of the savings range. A cost avoidance, based on the reduction in the number of Government Bills of Lading (GBLs) prepared under the RFCCP, was estimated to be \$272,711 to the Department of Defense, which includes \$115,459 to DLA. This cost avoidance is derived primarily from reduced labor requirements in the preparation of GBLs. Improved consolidation of shipments at the depots participating in the Round-Robin program and more efficient consolidation of minimum charge shipments outbound from the RFCC would increase savings. Based on the size of Round-Robin shipments originating at Defense Depot Susquehanna, PA the study concluded the fixed charge for Round-Robin shipments originating at that depot was too high.

Recommendations included increasing the efficiency of consolidation of shipments at the depots participating in the Round-Robin and working to improve efficiency of consolidation of minimum charge shipments at the Los Angeles RFCC. Finally the recommendation was made to negotiate with the Round-Robin operator to reduce the fixed charge for Round-Robin service between Defense Depot Susquehanna, PA and the RFCC.

DLA-93-P10096. Computation of Production Leadtime (PLT) Savings
Index No. 93-04

A new methodology allows Defense Logistics Agency value engineers to compute system-wide dollar savings associated with changing an item's PLT and/or price. The methodology considers total variable costs, item specific data, supply center specific rates, and other variables. Standard Automated Material Management System formulas for economic order quantity (EOQ) and safety level formulas are used. New formulas reconcile differences between actual and computed EOQ and safety level. The methodology replaces another whose accuracy has often been questioned since the early 1980s. The new methodology has been implemented on a personal computer as an analysis tool. This tool permits rapid item-specific study, produces two savings reports (one includes material costs while the other does not), displays graphs, and has embedded help texts. A companion data building tool stores item data that will be used by the savings tool.

DLA-93-P10028. Update of Vendor Consolidation Cost Savings Estimate for
Index No. 93-03 Regional Freight Consolidation Center (RFCC) at
Lake Park, GA

This is a cost analysis of vendor consolidation at the commercially operated Regional Freight Consolidation Center (RFCC) in Lake Park, GA. The Lake Park RFCC is the freight consolidation hub serving the southeastern portion of the United States. Based on analysis of freight moving through the RFCC for a one year period, annual savings are estimated to be \$22,710. Vendor tonnages appear to be decreasing. For example, monthly shipments into the RFCC averaged 319,299 for the first half of the year, but declined to 217,214 pounds per month for the second half. Consequently, average monthly savings dropped from \$3319 to \$465 between the two periods.

Based on the analysis, it was concluded that vendor tonnage shipped into the Lake Park RFCC decreased by about one-third during the year under review. It was recommended that steps be taken to reverse the trend and increase RFCC freight volume.

DLA-93-P00221. Long Supply Study
Index No. 93-02

The purpose of this study was to update and enhance an earlier DLA long supply study (DLA-LO Report number 85-07) completed in May 1985. The current study determined the number of items, quantity, cubic feet, and dollar value of long supply as of September 1991 for the Construction, Electronics, General, Industrial, Medical and Textile Commodities. This study also tracked the stability of long supply over a seven year period that was characterized by declining demands, identified characteristics which may influence long supply, determined long supply migration probabilities, calculated probabilities of buys, and determined methods to predict future long supply for the Electronics and General Commodities of DLA.

DCMR-93-P00002. Contract Line Item Price Analyzer Model Prototype
Index No. 93-01

This prototype model will aid DCMAO and DPRO cost/price analysts in evaluating multiple line item contract proposals. CLIPA allows analysts to find the lowest applicable price paid for an item and, when there is enough historical data, the risk of the proposed price. The data base is extracted from the price history part of the Air Force Acquisition Management Information System (AMIS) data base. The CLIPA-AMIS data base contains nearly 2 million buys representing over 900,000 National Stock Numbers (NSNs) and approximately 1,200 Federal Supply Codes (FSC). The model identifies high cost-risk items in the proposal and eliminates the need to research many of the low cost-risk items that have minimal potential payback. There is a large number of Defense Contract Management Command (DCMC) pricing cases. In FY91 an average of 775 DCMC cost/price analysts completed 35,483 pricing cases, including 18,255 for preaward surveys (valued at \$90.5 billion) and 17,228 for spare parts (valued at \$4.4 billion). The overall caseload is about 46 cases per analyst per year. At least half of these cases involved testing proposed parts prices for reasonableness. These cases had recommended savings estimated at \$1.3 billion. As a result of improvements in effectiveness due to CLIPA, savings on the cost of contracts could easily increase by millions of dollars annually.

DLA-92-C20192. Request for Not Mission Capable Supply (NMCS) Issue Priority
Index No. 92-37 Group I (IPG I) Backorder Analysis (July 1992)

The goal of this effort was to establish a Defense Logistics Agency (DLA) historical baseline of days on backorder for NMCS IPG I requisitions. The DLA baseline was computed as the difference between the requisition ship date (either depot or vender) and the requisition birthdate. The analysis included the number of backorders and the average days on backorder by month from April 1990 through March 1992. This historical period illustrated heavy backorder activity during Operation Desert Shield/Storm. DLA's response time throughout the period typically fluctuated around 40 days on backorder.

DLA-92-C20155. Economic Retention of Slow Moving Stock
Index No. 92-36 (February 1992)

This effort was conducted to support the Agency's Inventory Reduction Program. It was initiated in response to the General Accounting Office's (GAO) suggestion that items might be disposed after experiencing two consecutive years of no demand. This would represent a significant departure from the Agency's current policy. The items targeted for this analysis were those which had no demand during FY 85 and FY 86 (two years which captured peak DoD demand). Results of the analysis indicated that adopting the new strategy would have "saved" money for items in the electronics, general, and industrial commodities, while construction items would have "broken even." Overall "savings" would have amounted to \$11.7 million (FY 92). A significant finding was that almost one-half of the items that were identified as having no demand during FY 85 and FY 86, also had no demand in the subsequent five years. A limitation of this study was that there was no risk assessment completed for weapons items.

DLA-92-P20104. On-Site Testing of Foreign Dependency Model
Index No. 92-35 (September 1992)

Defense Systems Management College managed a research project, under the sponsorship of DLA, to develop an analytic framework for studying foreign dependency. The project resulted in a model which ranks groups of similar items based on dependency information such as Import Ratios, Domestic Production Capabilities, DoD share of Domestic Production, and overall trends in imports. This report outlines a functional test of the Foreign Dependency model at two Defense Electronics Supply Center and Defense Industrial Supply Center. Based on the results of the test, several refinements were made to the original model.

DLA-92-P20052. Processing Fee Pricing Strategy - Market by Example
Index No. 92-34 (September 1992)

This report documents the results of an analysis that evaluated the impacts of a processing fee pricing strategy on the cost of DLA goods purchased by its customers. The study provides various cost examples for assessing the impacts of a Processing Fee with a Reduced Cost Recovery Percentage. Specifically, different scenarios of consolidating requisitions for various lengths of time across a variety of DoD Activity Address Codes were evaluated as to how they affect costs customers pay for DLA goods. The report recommends that implementation of a Processing Fee plus a Reduced Cost Recovery Percentage.

DLA-92-P20041. Optimal Sampling Plans for Items Representing Two Population
Index No. 92-33 Groups (April 1992)

This study examined the problem of determining optimal sampling plans to support DLA's Quality Assurance Laboratory Testing program. The items to be sampled belonged to two distinct populations which were partitioned into sub-populations requiring sampling plans: ultimate DLA storage depot and Defense Contract Management Command District with inspection oversight responsibility. Three mathematical programming models were investigated that minimize the total sample size while ensuring that the proportion of samples closely resembled the actual population proportions. Both linear and non-linear programming techniques were used to find an optimal sampling plan. Comparisons were made from the solutions generated for all three models. The report recommended using a nonlinear model with a quadratic objective function to minimize the total sample size requirement.

DLA-92-P20020. A Plan for Assessing DLA's Future Business Activity
Index No. 92-32 in a Changing DoD Environment (August 1992) RAND Report

DLA's mission is to provide the Armed Forces with logistics support and services, efforts that are customarily referred to as DLA's "business activities." DLA needs an assessment of how its future activity is likely to change and an understanding of the factors that will affect its activity. In addition, forecasts of future workloads will be required to provide a basis for long-term planning. This project was an exploratory effort to identify and select the appropriate DLA business elements and the external factors that affect the activity levels of those elements. The project developed an initial description of an approach or model relating the external factors to various DLA activities. Various DLA groups were interviewed and literature review was conducted to help understand both the nature and magnitude of DLA activities. An initial list was constructed of potential factors that drive DLA workload, both in peacetime and in wartime. That list includes force structure factors, DMRDs, and military service support policies. A basic functional form of a model to assist DLA in understanding the impact of external factors on the workload indicators that drive DLA activities was prepared.

DLA-92-P10201. Defense Logistics Agency Defense Integrated Subsistence
Index No. 92-31 Management System (DISMS) Final Economic Analysis
(August 1992) KPMG Peat-Marwick Report

The purpose of this economic analysis was to determine the economic merits of continued development and implementation of the DISMS Increments I through IX. The report documents the analysis of the current environment, which is considered the Baseline, and the Alternative. The Baseline consists of the deployed Increments of DISMS (I through IV), the existing portions of the Legacy Systems, and the existing systems and procedures which bridge operations between the Legacy System and the completed DISMS increments. The analysis concludes that Increments V through IX will produce substantial operational savings and justify planned investments. Consolidating the majority of the distribution and financial functions into a single integrated system is an enabling technology that should assist DPSC in operating in a more effective and efficient manner. The study includes broad recommendations dealing with the management of the DISMS upgrade. They fell into four areas: documentation, program management, self-assessment, and Technology.

DLA-92-P10189. Development of Performance Indicators Supporting of Quality
Index No. 92-30 Management Board (QMB) 3 (October 1991)

This brief study focused on developing measurable performance indicators to monitor the success of initiatives sponsored by one of DLA's five major Quality Management Boards; QMB 3. QMB 3 was tasked with ensuring that DLA deploys information systems that meet user needs. Measures were developed and recommended for: accessibility, value added, deployment against milestones, and productivity improvement. This short report details the development and composition of these indicators.

DLA-92-P10164. DLA Vendor Rating System (DVRS) (August 1992)
Index No. 92-29

The DVRS is a tool to enhance the DLA buyer's ability to make a "best-value" contracting decision. Because efforts to quantify past performance are labor and data intensive, an automated, standardized method was needed to measure a contractor's historical performance. DVRS is mainly an automated system that collects historical data from numerous sources, consolidates raw data and performs an analysis to produce ratings in a systematic approach. These ratings are passed into the DLA Pre-Award Contracting System to be shown along with bid prices to assist in the bid evaluation process. DVRS is a composite rating that measures a vendor's quality assurance program and on-time delivery effectiveness over a two year period. Under this project a prototype model was developed for use at the Defense General Supply Center.

DLA-92-P10148. Stockage Location Policy Analysis (June 1992)
Index No. 92-28

The purpose of the study was to evaluate alternative stockage policies and to assess Department of Defense (DoD) demand stability assumptions at the wholesale level. Three policies were analyzed under a DoD distribution system that fully implemented depot consolidation. The first policy evaluated was the "stock closest to the customer" option which represented the historical strategy. The second was the "stock closest to the vender" option which represents the DoD directed strategy under Defense Management Review Decision (DMRD) # 901. A third policy was also examined which represented a hybrid of the previous two stockage location strategies. Lastly, the project examined the fundamental assumption that DoD demand was stable at the wholesale level. The study found that stocking closest to the vendor was the least overall cost to the Agency in the cost categories considered.

DLA-92-P10146. Analysis of DLA's Quality Assurance Testing
Index No. 92-27 Laboratories (October 1991)

This study was undertaken to identify the resource requirements associated with the proposed expansion of DLA's organic laboratory testing capabilities. The primary objective of this effort was to identify, from an economic standpoint, the number and location of laboratory facilities needed to support the Agency's testing requirements. Candidate locations for the facilities were: Defense Distribution Region West (DDRW: Sharpe location), Defense Distribution Region East (DDRE: New Cumberland), Defense Depot Columbus Ohio (DDCO), and Defense Depot Memphis Tennessee (DDMT).

The key assumption in the analysis was that three hardware centers (DISC, DCSC, and DGSC) combined would be conducting 15,000 tests per year. The analysis showed that three laboratory facilities would be required to support 15,000 annual tests. Under current stockage policies, there was no significant cost differences by locating testing facilities at DDRE/DDRW/DDCO or DDRE/DDRW/DDMT. Under Depot Consolidation, a small cost savings was identified by locating the third laboratory at DDMT. This was attributed to lower shipping costs. The estimated cost of establishing the three facilities was \$4.5 million. Average annual operating costs were estimated at \$3.4 million. Personnel wages and benefits represented 84 percent of annual operating costs. The cost of performing a typical organic test was estimated at \$313.00. Based on DISC's testing program data, a similar commercial test would cost about \$290.00.

DLA-92-P10110. Impact of Increasing the Non-Competitive Threshold from
Index No. 92-26 \$2,500 to \$5,000 (October 1991)

In January of 1991, DLA was authorized to increase the non-competitive threshold on procurement actions from \$2,500 to \$5,000 on a test basis. An analytical model was developed to determine the impact of this threshold change on prices paid by DLA Supply Centers. The model was run in phases

during the test period. Initially, no statistically significant price increases could be shown. As the test period matured and more data became available, a general increase in unit prices became apparent at some Supply Centers. This study documents the development of the model and the final results.

**DLA-92-P10106. Impact Costs of Inadequate Requirements and Training on the
Index No. 92-25 ADP/T Acquisition Process (January 1992)**

The adequacy of training of contract personnel and the adequacy of defined requirements are evaluated to determine their impact on the Automated Data Processing (ADP) acquisition contractual process. Impacts are quantified in terms of lost opportunity cost (by the customer) and additional labor cost as a function of time delay. This was accomplished by assessing Procurement Acquisition Lead Time (PALT) delays across eighteen sampled contracts and then interviewing contract personnel as to the cause of the delay. The impact costs provide a measure of the effects of poor training and ill-defined requirements on the ADP acquisition process. Analysis showed the annual impact costs are \$90,000 for additional labor and \$9.15 million for lost opportunity costs. A majority of these costs are attributable to requirements being poorly developed during the initial phase of the acquisition process. Inadequate training of contract personnel is responsible for only about 10 percent of the impact costs. The study concluded that requirements should be fully defined up front during the Definition/Validation phase of the acquisition process.

**DLA-92-P10093. Defense Contract Management Command Staffing Assistance Model
Index No. 92-24 (May 1992)**

This set of models uses workload indicators to equitably estimate the total staffing resources needed at each DCMAO and DPRO. Regression analysis is used to identify those apparently logical workload indicators that have statistically valid correlations with staffing. It also quantifies the relationship between these valid indicators and the staffing. The average error is about 7 percent for the DCMAO model. For the DPRO model, the average error, about 11 percent, is higher because contractor activity at DPROs is less stable and the data is less reliable. The essence of the methodology is simply to estimate resources by comparing workload versus resources at all of the different activities. As a result, it is easy to visualize. The models use most automated indicators, track contractor business activity, and can take into account work that is not discretely measurable. They set a uniform, analytical approach for Headquarters DCMC, and DCMC district commanders, to compare workload, and to balance and allocate resources. The models also highlight patterns in staffing, and by using control limits they identify activities that are potentially over or under resourced. Judicious use of the models, coupled with other analyses or field reviews, can result in important savings and avoidances.

**DLA-92-P10090. A Comparative Cost Analysis of Material Handling Equipment
Index No. 92-23 for the Connector Building Complex (October 1991)**

This study compares the cost of implementing an automated guided vehicle system to the cost of utilizing conventional equipment for the same functions in the Connector Building Complex (CBC) at Defense Depot Richmond, Virginia effective for the CBC. The results indicate that an AGV system would not be cost effective at any foreseeable workload level. Implementation of a full scale AGV system, which would handle a workload similar to that which DDRV currently handles, would have a 10-year life cycle cost of \$8.4 million in discounted dollars. This study recommends using forklifts and transporters to handle the same workload, at a cost of \$2.2 million in discounted dollars, over the same life cycle. Selection of this alternative would result in a cost savings to DLA of \$6.2 million in discounted dollars over the AGV system.

**DLA-92-P10077. Workload Projection for Primary Distribution Sites
Index No. 92-22 (October 1991)**

This involved an analysis of alternative stockage policies for DLA binnable items at the Primary Distribution Sites (PDS) of the DoD Consolidated Supply Depot System. Under the Depot Consolidation Concept, it was envisioned that the majority of requisitions would be filled by the three PDS's-San Joaquin, CA, Susquehanna, PA, and Memphis, TN. The two stockage policies under consideration were "stock closest to customer" and "stock closest to vendor." The objective of the analysis was to determine the impact of each policy measured in terms of issue workload changes and changes in storage cube

Under the "closest to customer" policy the current Susquehanna yearly issue workload of 3.5 million increased by more than one hundred and fifty percent up to 8.9 million. At the same time, San Joaquin's 3.5 million issues increased by about fifty percent while the Memphis 3.6 million issues experienced no change. Under a "closest to vendor" policy, which required that weapon systems items be stored in at least two sites, a workload increase of 130 percent was projected at Susquehanna up to 8.1 million, 37 percent at San Joaquin up to a total of 4.8 million, and 25 percent at Memphis up to 4.5 million.

**DLA-92-P10037. Multiple Forecasting Techniques for Fuels
Index No. 92-21 (June 1992) DFSC-RO Report**

This report documents the results of a study examining the multiple forecasting model on fuel sales data and demonstrates improvements in forecasting accuracy that could be realized through the use of the multiple forecasting techniques. More accurate forecasts of demands at the Defense Fuel Supply Points and other customer locations will allow the Defense Fuel Supply Center to better support them by lower-cost fuel movements, fewer emergency shipments and fuel purchases, and perhaps lowered inventory levels

resulting from reduced safety level requirements. The report demonstrates that the multiple forecasting technique often provides a more accurate forecast than the current system.

DLA-92-P10026. Transportation Costs Analysis of Vendor Consolidation
Index No. 92-20 at the Dallas, TX, Regional Freight Consolidation Center
(January 1992)

This report documents the results of a transportation cost analysis of vendor freight consolidation at the Dallas, TX Regional Freight Consolidation Center (RFCC) contractor operated facility for the 6-month period ending 30 June 1991. Costs for shipping vendor freight through the RFCC are compared to the estimated cost of shipping from the vendor direct to the depot. Cost differentials are computed and savings are estimated. Based on the results of the analysis, the Dallas RFCC saved approximately \$148,000 for the 6-month period.

DLA-92-P10015. Bid Evaluation for the Regional Freight Consolidation
Index No. 92-19 Center Southeastern and South Central Regions
(January 1992)

This is an analysis of the carrier bid submissions for the Regional Freight Consolidation Center (RFCC) Southeast and South Central regions. The RFCC bid evaluation model for commercial pooling is a simulation model developed under project No. DLA-92-P10014. Pooling is defined as the consolidation of truckload shipments from the depots into large less-than-truckload lots for transshipment to the customer. The model simulates the current system to develop a baseline cost and the proposed RFCC system to develop a carrier total cost. The carriers are ranked from low cost to high cost and the costs are compared with the baseline to determine the carrier's cost effectiveness. The analysis showed that the South Central region was not cost effective and that the Southeast region was marginally cost effective. Further analysis was performed for the cost effective carrier for the Southeast to determine workload requirements.

DLA-92-P10014. Model to Analyze Carrier's Bids for the Regional Freight
Index No. 92-18 Consolidation Center (RFCC) Workload (September 1992)

This report documents a simulation model developed to analyze carrier's bid submissions for commercial pooling at the Regional Freight Consolidation Centers (RFCCs). Pooling is defined as the consolidation of truckload shipments from the depots into large less-than-truckload lots for transshipment to the customer. The model simulates the current system to develop a baseline cost and the proposed RFCC system to develop a carrier total cost. The carriers are ranked from low cost to high cost and the costs are compared with the baseline to determine the carrier's cost effectiveness. Further analysis can be performed for the cost effective carriers to determine workload requirements. The model inputs consist of stochastic and

deterministic data. The stochastic data includes depot processing time distributions, less-than-truckload and truckload transit time distributions. The deterministic data consists of the carrier's bid submissions -RFCC hold times and transit times and Guaranteed Traffic rates.

**DLA-92-P10010. Consumable Item Transfer (CIT) Savings Determination Model
Index No. 92-17 (February 1992) DESC-RO Report**

The CIT Savings Determination Model was developed to help managers portray the savings to Department of Defense and the Government of the Transfer of items to Defense Logistics Agency management. The model quantifies savings from volume (including Commodity Oriented) procurement with price breaks, item reduction savings due to consolidation of item into families, and any administrative savings as a result of consolidation. The model projects savings over 20 years following the transfer of the item in the period 1991-1994. Summaries of each type savings as well as the net savings when compared to the estimated setup costs are presented.

**DLA-92-P00248. Economic Analysis of the Defense Logistics Agency's Data
Index No. 92-16 Index Processing Center Consolidation; a study by KPMG Peat
Marwick (January 1992).**

The Defense Logistics Agency (DLA) had been in the process of implementing a consolidation plan which will significantly decrease the number of its mainframe information processing centers (IPCs). The purpose of this analysis was to objectively assess both a three-IPC alternative (alternative 1) and a three-site scenario (alternative 2) with continuity-of-operations capability. The net present value of savings over nine years amounted to \$40.6 million for alternative 1 and \$39.7 million for alternative 2 (fiscal year 1992 dollars). Payback period in both alternatives was approximately two years from the initial investment. The study recommended a single migration to the three-site scenario be considered to realize greater savings and expend less effort than a two-step migration process.

**DLA-92-P00234. Simulation of Defense Distribution Region West
Index No. 92-15 (DDRW) Regional Freight Consolidation Center
(RFCC) (January 1992)**

This project involved a simulation analysis of the proposed mechanization design of the RFCC at the San Joaquin site of the Defense Logistics Agency DDRW. An increase in expected workload at that site due to depot consolidation, along with the addition of Consolidation and Containerization Point functions to the RFCC, has caused extensive changes to the design. The purpose of this analysis was to evaluate the mechanization design, identify any design problems, and recommend solutions or possible improvements.

Three major areas of concern were identified in the analysis. First, expected value analysis showed two automated guided vehicles (AGVs) could not handle

the workload from the palletization stations. The AGV path was redesigned to allow four vehicles. The second problem was inadequate throughput capacity at parcel data collection. Expected value and simulation analysis of this area indicated the number of workstations should be increased from six to nine. The third area of concern involved the assignment of lines to customers on the main carton sorter. The simulation demonstrated that how this assignment was made was critical to the efficient operation of the sortation system.

DLA-92-P00223. Depot Macro Analysis Program (DMAP) Version 1.0
Index No. 92-14 (July 1992)

This effort involved development of a strategic level model available for conducting "quick reaction" stockage policy tradeoffs. The intended operating environment for this model was on available personal computer workstations capable of displaying interactive graphics. This project encompassed development of a pc-based decision support model with the capability to rapidly evaluate stock positioning of selected commodity areas under alternative decisions. The model has been structured to empower senior staff with a tool for gaining macro-level insights through interactive analysis of business patterns. The model is a shell into which the user inputs data identified for specific analyses such as hazardous material site analyses and C & T storage site analyses.

DLA-92-P00191. Review of Additional Characteristics for Use in Cost Recovery
Index No. 92-13 (March 1992).

The item characteristics of DLA managed goods were examined to determine whether separate pricing based on these characteristics was warranted. The primary objective was to develop a fair and accurate pricing strategy that could be quickly implemented by DLA and which was easy to understand. Analysis identified a potential pricing strategy, requisition processing fee plus a reduced cost recovery factor, that would allow DLA to price its goods in a more equitable manner. This strategy would assign the increased costs of low dollar value requisitions to their generators and a savings to customers with larger dollar value buys. At the same time, overall costs to DLA would decrease. However, some concerns have been expressed that military service customer operating costs might increase, possibly negating some or all of the savings to DLA. It is recommended that DLA pricing strategies be developed in coordination with the Services on a DoD wide basis to minimize total supply system costs.

DLA-92-P00129. Historical Data Bank Strategy (May 1992)
Index No. 92-12

This effort was undertaken to examine strategies and policies for archiving data in support of DLA managers and analysts, and to compare DLA practices with those of other government and private sector organizations. The study looked at and described many of DLA's key automated data bases and files,

described users and uses of historical data in DLA, proposed an approach to determine what historical data DLA should maintain, and proposed overall policies for historical data management. Recommendations included linking historical data use to DLA's critical success factors, measures, and models of business process. The report also proposes a strategy for historical data management objectives, critical success factors, and an organizational approach.

DLA-92-P00122. Analysis of Local Procurement for Medical Items
Index No. 92-11 (February 1992)

This study effort involved identifying and evaluating cost tradeoffs which exist between the centralized purchasing of medical supplies versus local purchasing options. Specifically examined were all reported purchases under Federal Supply Class (FSC) 6505 (Drugs, Biologicals, and Official Reagents) for the period between Fiscal Year (FY) 1989-4 through FY 1990-3. This FSC constitutes 11 percent of the Agency's net sales across all items exclusive of fuels. Local purchase data for the Military Services was obtained from the data records of the Defense Medical Standardization Board located at Ft. Detrick, MD., while centralized purchase data was derived from data maintained by the Defense Logistics Agency (DLA). Additionally, the study team conducted site surveys, as well as telephone interviews, of selected purchasing offices located with military hospitals. These surveys were intended to confirm purchasing procedures and pricing data. The study found that it is less expensive to buy medical items centrally rather than by local procurements.

DLA-92-P00092. Study of U.S. Dependency on Foreign Industrial Products
Index No. 92-10 (December 1992) The City College of the City University of New York Report

This study focused on developing a basic model for determining and quantifying foreign dependence for DLA managed items. Factors that comprise the basic dependency concept are identified and examined. These factors include total capacity, volume of imports, total domestic demand, exports, and total DoD demand. Steps offsetting the foreign dependence of a product, like the expandability and convertibility of domestic sources, are addressed. Dependency at lower tiers (piece parts, subassemblies, etc.) is also studied. Risk assessment models are developed to quantify import vulnerability. These import vulnerability models incorporate the above key factors along with specific country risk factors. The models can be used by DLA Item Managers and Industrial Preparedness Planners to rank products by potential import vulnerability and to help prioritize formal planning efforts.

DLA-92-P00003. Benefits Quantification for Enhancements to Selected
Index No. 92-09 Automated Information Systems (October 1991)

This study encompassed quantifying the benefits for 13 enhancement projects affecting the Standard Automated Materiel Management System (SAMMS). This

study estimated the number of personnel, personnel dollars, inventory dollars, and total dollar savings for each enhancement project. Additionally, the study estimated the undiscounted savings by number of years after implementation for each project. Since the actual year of implementation was not known for any of the projects, the study team identified savings by year relative to each project initiative, but could not identify savings in any specific year. However, each enhancement did produce substantial savings.

DLA-92-P90259. An Estimate of Transportation Savings from the Regional Freight Consolidation Center (July 1992)
Index No. 92-08

This work involved an analysis of the potential savings of the Regional Freight Consolidation Center Program (RFCCP). The feasibility studies, published in 1987 and 1988, explored the RFCCP concept under ideal conditions, presenting a best case scenario. The purpose of this study is to re-evaluate the possible savings in transportation dollars of the RFCCP based on the first 3 years of experience with limited RFCC operations. Experience with the vendor program is based on operations at the five commercial sites; experience with the pool program is limited to the one operational pool site located in Los Angeles. The objectives are: to calculate the transportation cost of direct shipment; to calculate the cost of those same shipments through the RFCCP and to compare the results of those calculations on a site and on an overall basis. The scope of the study encompasses both vendor and pool operations at the 11 RFCC sites, using data from the period July 1989 through June 1990; the scope of this work does not include the Primary Distribution System. Projected system-wide RFCC savings fell from \$31M in the original feasibility studies to \$5M in the new report. The difference is attributed to; more representative Class 50 transportation rates utilized in the update, less than expected vendor RFCC participation, and reduced Government freight rates obtained through the Guaranteed Traffic program.

DLA-92-P90124. Quality Assurance Resource Models (QUARM) (May 1992)
Index No. 92-07

This report documents a set of models which use workload indicators to equitably estimate the Quality Assurance Operations personnel resources needed at each DCMAO and DPRO. Regression Analysis is used to identify, and quantify, those logical workload indicators that have statistically valid correlations with the corresponding workhours from the Automated Payroll Cost and Accounting System (APCAPS). These APCAPS workhours include all QA Operations time less supervisory, clerical and leave hours. The DCMAO model is statistically more significant than the results for the DPRO models. The average error between the actual and estimated hours for DCMAOs is 12 percent. The three DPRO models average error is 9.2 percent. However, when applied to recent QA data as a test, the DCMAO model performed well and better than the DPRO models. The QUARM models set a uniform, analytical approach for DCMC Headquarters, District Commanders and District QA Directors to compare workloads and balance resources. Judicious use of the models, coupled with other analyses or field reviews can result in important cost savings.

**DPSC-92-P00006. Evaluation of Chicago and Alternate Defense Subsistence
Index No. 92-06 Office (DSO) Locations in Support of Mid West Customers
(December 91) DPSC Report**

An evaluation was performed to compare the cost of using the current Subsistence cold storage warehouse location in Chicago to several other cold storage locations in the mid West. Five alternatives were considered in addition to utilizing DSO Chicago: (1) keeping fresh fruits and vegetable (FF&V) mission in Chicago, and splitting the chill and freeze (C&F) customers between Kansas City and Nashville; (2) keeping FF&V in Chicago and sending all C&F customers to Kansas City; (3) keeping FF&V in Chicago and sending all FF&V customers to Nashville; (4) keeping FF&V in Chicago and moving the FF&V business to Lafayette, Indiana; and (5) closing Chicago, and moving the entire operation to Lafayette. Cost factors included the potential increase in FF&V handling and shipping costs in Chicago and Lafayette; the probable C&F transportation costs from Kansas City, Nashville, and Lafayette to current Chicago customers; the C&F storage costs at Kansas City, Nashville, and Lafayette; and any severance pay, relocation costs or training and TDY costs that might be incurred.

**DPSC-92-P00005. European CDC Warehouse Space Requirements in Support of DECA
Index No. 92-05 (January 1992) DPSC Report**

DoD Directive 5105.55, subject: Defense Commissary Agency (DeCA), dated 9 November 1990 sets forth the standards and conditions under which this new Agency will function as the sole source Headquarters and manager for the worldwide commissary system. A study was performed to provide DeCA personnel with an analysis of the ordering patterns of European customers, analyze the historical demand patterns of the 4500 items on DeCA's stockage list, determine the amount of warehouse space required and the number of rack openings needed for a Central Distribution Center in Gernersheim, Germany.

**DPSC-92-P00004. Analysis of Subsistence Redistribution from January to
Index No. 92-04 October 1991 (March 92) DPSC Report**

Subsistence Supply Operations personnel requested an analysis to assess the cost effectiveness of their current redistribution policy. The probable costs of shipping stock from one depot to another and then onward to a customer were compared to the costs that would likely be incurred to ship directly from the out of area depot to the customer. The analysis focused on redistributions of semi perishable food items that were made to preclude imminent not-in-stock (NIS) conditions from occurring during January to October 1991. The analysis, which assumed a worst case scenario of every customer shipment being less than truckload (LTL), compared the cost of shipping stock from a secondary to a primary depot and then to the customer versus shipping directly from the secondary depot to the customer. Also included were the depot line item costs of moving stock out of and into a depot. For every depot that received a redistribution because of an NIS position, savings were realized. The

individual depot savings ranged from a low of \$6,000 to a high of \$360,000 with the overall savings totalling an estimated \$661,000.

DPSC-92-P00003. User Guide for Subsistence Variable Forecast (SVF) System
Index No. 92-03 (December 1991) DPSC Report

The Subsistence Variable Forecast (SVF) System will aid the item manager in determining the requirements for an items by warehouse or location. The SVF system will select the best forecast based on historical demand patterns and performance. It will also provide a view of the last three years demand data both recurring and non-recurring. The data is extracted from the mainframe systems and is downloaded to the Distributed Mini Computer System (DMINS), where the forecast is run. The data is sorted by perishable and semi-perishable grouping and then by individual manager code. The forecasts and the demand data can be downloaded to an item manger's personal computer (PC). The data and forecasts can also be accessed in a spreadsheet format. The spreadsheet formats have been designed specifically for each section: perishable brand name, perishable troop, and semiperishable. The user guide has been designed to guide each item manager through the steps of retrieving his/her data and utilizing the spreadsheets to complete the recommended buys.

DPSC-92-P00002. Analysis of Demand Migration for Semi-Perishable Items
Index No. 92-02 (July 92) DPSC Report

Current DLA studies for non subsistence items suggest storage of an item's inventory at warehouses closest to vendors is more cost efficient than storage of inventory closest to customer. The basic finding in these studies is that demand patterns fluctuate geographically from year to year. The studies conclude that stocking inventory, for non subsistence items, closest to the vendor minimizes overall first destination transportation costs over time. This analysis reviewed demand patterns between warehouses for semi-perishable items. Only two percent of NSNs reviewed showed any indication of demand migration; it appears that semi-perishable items do not experience migrating demand.

DPSC-92-P00001. Users Guide for the Milk Economic Price Adjustment Program
Index No. 92-01 (December 1991) DPSC Report

This publication is a step by step user's manual to guide the Subsistence milk buyers through the computer program and formulas which develop monthly price adjustments for contracted milk products. The manual is based upon the adoption of the results from the Jan 91 report = "Economic Price Adjustment Formulas for Milk and Processed Milk Products."

DLA-91-P10173. Primary Distribution Site (PDS) Location Analysis
Index No. 91-41 (August 1991)

This report presents the results of an analysis of alternative configurations for the consolidation of Department of Defense Supply Depots. This consolidation is being undertaken by the Defense Logistics Agency (DLA) under Defense Management Review Decision 902. The DLA Depot Consolidation Office has developed a concept for managing the consolidation depots using Primary Distribution Sites (PDSs). Given acceptance of the PDS concept, the purpose of this analysis was to determine how many PDSs there should be, and where they should be located. The results of the study indicated that a three PDS configuration consisting of Mechanicsburg/New Cumberland, PA, Memphis, TN, and Tracy/Sharpe, CA, provided the lowest cost while not overly exceeding the sites' capacities to process the workload. Further analysis showed that a reduction of 25 to 30 percent in CONUS demand combined with a 50 percent reduction in east coast overseas demand would be required to make the two site configuration a viable option.

DLA-91-P10044. Update of Cost of Late Delivery Study
Index No. 91-40 (May 1991)

Recent changes in procurement policy and the availability of more recent historical data warrant an update of the Cost of Late Contractor Delivery Study (Project No. DLA-89-P81011). As in the previous study, the direct costs (labor and materials expended to resolve a late delivery) were insignificant when compared with the indirect costs (maintaining increased safety levels due to increased production lead times). Since indirect costs are sensitive to back order goals and vary from item to item, the cost of a late delivery is different with each Center. The updated average cost per late delivery is listed below by commodity:

DCSC	\$728
DESC	\$290
DGSC	\$1,190
DISC	\$360
DPSC-Medical	\$417

DLA-91-P10027. Transportation Cost Analysis of Vendor Consolidation -
Index No. 91-39 New Jersey RFCC (June 1991)

This report documents the results of a transportation cost analysis of vendor freight consolidation at the New Jersey Regional Freight Consolidation Center (RFCC) contractor operated facility for the 8-month period ending 30 September 1990. The study is part of the continuing analysis of RFCC implementation and

operation. The results showed that during the 8 months of operation reviewed, vendor consolidation at New Jersey saved approximately \$614,910 in transportation expenditures. Based on observed trends in the RFCC data for New Jersey, transportation savings are expected to continue. The carrier appeared to have made a good improvement in trailer utilization over the 8-month time period with average shipment sizes currently ranging between 15,000 and 21,000 pounds depending on the destination.

DIA-91-P10021. Transportation Cost Analysis for RFCC Vendor Consolidation -
Index No. 91-38 Chicago, IL (March 1991)

This report documents the results of a transportation cost analysis of vendor freight consolidation at the Chicago, IL, Regional Freight Consolidation Center (RFCC) contractor operated facility for the 6-month period ending 30 September 1990. The study is part of the continuing analysis of RFCC implementation and operation. The results showed that during the 6 months of operation reviewed, vendor consolidation at Chicago, IL, saved approximately \$359,350 in transportation expenditures. Based on observed trends in the RFCC data for Chicago, IL, transportation savings are expected to continue. The carrier appears to be utilizing trailers to the maximum extent possible with average shipment sizes ranging between 20,000 and 35,000 pounds depending on the destination.

DIA-91-P00258. Analysis of Pool Distribution Operations at the Los Angeles,
Index No. 91-37 California, Regional Freight Consolidation Center (March
1991)

The analysis of pool distribution operations at the Los Angeles, CA, Regional Freight Consolidation Center (RFCC), was undertaken to compare the cost effectiveness of pooling operations at the Los Angeles RFCC site against the cost of direct shipment to the customer. This study covers the period January through September 1990. "Pooling" refers to the movement of freight from a depot in truckload quantities to an RFCC site. There the freight is "pooled" with freight from other depots to build larger less-than-truckload shipments for short distance hauls to the customer. This study is the third such analysis of the cost effectiveness of pooling operations at the Los Angeles site. The two previous analyses estimated that pooling operations over their respective periods of study lost money. One of the conclusions of this study is that over the 9-month period studied, an estimated \$89,068 was saved. The study recommends that pooling operations be continued at the Los Angeles RFCC and that an additional study be undertaken in the future to confirm that pooling operations are continuing to save transportation dollars.

DLA-91-P00249. Rapid Response Mobilization Indicator (May 1991)
Index No. 91-36

The Defense Logistics Agency's Industrial Preparedness Program planners envisioned an enhanced capability for assessing the Agency's readiness in supporting the Services' projected war reserve material requirements. Such capability would provide planners valuable information for identifying and prioritizing industrial planning workload, identifying potential supply problems, and assessing potential risks during the time of mobilization, and would serve as a source for basing critical resource allocation decisions. During the initial stages of Operation Desert Shield (ODS), it became more apparent that such capability was urgently needed. Two areas of immediate concern were the identification of items in which rapid industrial support would be required and the determination of funding requirements needed to procure DLA-managed parts for ODS. Based on the above requirements, a deterministic mainframe based model was developed. The model uses applied inventory theory, historical demand rates, inventory control data, as well as Services' provided wartime supply demand factors to calculate a National Stock Number's (NSN) initial readiness value and an inventory position over a prescribed time horizon. By anchoring an NSN's reorder point, objective quantity and production lead time values within the model, time-phased data can be generated for estimating procurement schedules, order quantities and funding requirements. Capabilities of the model include calculating a "proactive" procurement schedule, determining ability of on-hand and due-in stocks in meeting mobilization requirements, and assessing summary funding requirements on an NSN and time horizon basis. In addition to overall DLA requirements issues, the model output was used to identify DLA's funding requirements and for supporting 32 Army weapon systems deployed in ODS. A second application was the identification of potential inventory shortfall of parts for the Army's AH-64 Apache helicopter.

DLA-91-P00218. Projected Impact of Decreasing Department of Defense Budgets
Index No. 91-35 and Consumable Item Transfers on the Defense Logistics Agency

The purpose of this study was to evaluate the impacts of the Consumable Item Transfers mandated by Defense Management Review Directive 926 and impending budget cuts on the Defense Logistics Agency demand workload. This study estimated the net effects of the DLA demand workload increases due to the transfer of approximately 961,000 items from the Military Services to DLA and the demand workload decreases due to reduced national defense budget outlays. Based on the results of this study, DLA should expect a net increase in demand in terms of constant FY 90 dollars from FY 90 to FY 93, followed by a slight decline from FY 92 to FY 95. However, these net effects on demand workload vary widely by commodity due to the uneven commodity distribution of the Consumable Item Transfers. The predicted demand workload figures for FY 91 through FY 95 were broken out by center and by year in this study to assist with advance workload planning.

DLA-91-P00204. Sampling Plan Development in Support of DLA's Quality Assurance Laboratory Testing Program (September 1991)
Index No. 91-34

DLA has initiated actions to improve DLA's Quality Assurance Program by establishing a program of laboratory testing. However, to effectively implement the program, statistically sound sampling plans needed to be developed. Such plans would be used by the Agency in determining appropriate sampling requirements and confidence levels of estimating material conformance levels. The purpose of this effort was to develop the required sampling plans as well as a forecasting tool which would be used in predicting the change in conformance levels over time. This report describes the methodology used in developing the sampling plans and forecasting tool. An analysis of the prototype sampling plans and forecasting tool is also provided.

DLA-91-P00202. Civilian/Military Compensation Comparison (December 1990)
Index No. 91-33

This report presents the results of an assessment of relative personnel costs of civilians versus military. It provides an impartial comparison using comparable pay components for both military and civilian. Although the study is a "generic" comparison, without regard to the mix of military targeted for civilianization, the methodology can be used to estimate expected savings for a specific population.

DLA-91-P00189. DoD Supply Depot Consolidation: Preliminary Estimate of Savings (October 1990)
Index No. 91-32

This report presents the results of an initial, first-order assessment of the magnitude of savings anticipated with DoD-wide depot consolidation based on the latest information available and current system concept. Gross operational savings of \$142 million to \$260 million per year were identified, assuming that the consolidated depot system eventually will operate at current Defense Logistics Agency unit costs. Moving to a common software system, the Defense Distribution System (DDS), nets an additional \$25 million to \$43 million in yearly savings. Through greater utilization of DLA's Guaranteed Traffic Program, an additional \$6 million in annual savings can be realized. Total recurring savings equal \$173 million to \$309 million per year. In addition, greater resource utilization due to depot consolidation eliminates the need for \$342 million in planned military construction through FY 95. On the cost side, implementation of the DDS will require a one-time expenditure of \$74 million, with an annual equipment maintenance cost of \$2 million.

DIA-91-P00177. Forecasting Digital Microcircuit Obsolescence (March 1991)
Index No. 91-31 (March 1991)

This report documents a procedure for forecasting digital microcircuit obsolescence at the Defense Electronics Supply Center, Dayton, OH. Obsolescence is caused by rapid advancement in digital technology and decrease in commercial demand while military demand still continues. In logistics parlance, parts obsolescence is known as a Diminishing Manufacturing Source (DMS) problem. Continued supply of an obsolete DMS item is assured via substitution, alternate sourcing or a one time buy equal to the lifetime requirements of the item. Emulation is a recent alternative which explores the possibility of replacing obsolete digital microcircuits with state-of-the-art devices which can be manufactured and supplied on demand. The report recommends use of a statistical model which forecasts DMS items from a population of presently non-DMS items belonging to obsolete digital microcircuit technologies. The items forecast by the model should be evaluated for their emulation potential.

DIA-91-P00128. Marginal Cost of Soliciting Automated Data Processing
Index No. 91-30 Equipment (November 1990)

The Defense Logistics Agency Automated Data Processing (ADP) Contracting Office (DLA-DACO) requested a study to determine the marginal cost which accurately reflects the additional cost of soliciting via a Request for Proposal (RFP) instead of ordering from the GSA ADP schedule. The cost of soliciting via a RFP was determined to be \$19,000 more than the cost of ordering from the GSA schedule for ADP items costing between \$25,000 and \$100,000. For RFP acquisitions between \$100,000 and \$300,000, the marginal cost was \$28,000. These marginal costs are deemed conservative due to the exclusion of other factors. Factors not included are the cost of other DLA organizations involved with the solicitation process and the unquantifiable productivity cost associated with an ADP equipment delay. In addition, marginal costs should be recalculated each year using an average DACO salary comprised of section chiefs and below.

DIA-91-P00121. Review of the Traditional Stock Fund Surcharge
Index No. 91-29 (September 1991)

The purpose of this effort was to conduct a review of the "traditional" (or pre-supply support cost) surcharge methodology. It was found that existing guidance (including interim policy and revisions in process) on the subject is current but very broad, and that DLA's method of developing the traditional surcharge is in conformance with this broad guidance. It was noted that while long term cost recovery results were good, year to year cost recovery results fluctuate widely. Frequent change occurs in the components used to develop the surcharge rate and minor irregularities have occurred, however, no major discrepancies were noted. The report recommends that the traditional

surcharge be incorporated in the standard unit price. It is further recommended that DLA standardize the procedure for computing the traditional surcharge.

DLA-91-P00119. User's Guide for the Security Equipment Cost Utilization Index No. 91-28 Requirements Evaluator (SECURE) Model (December 1990)

This document is a user's guide for operating the Security Equipment Cost Utilization Requirements Evaluator (SECURE) model, which enables the Defense Logistics Agency Office of Command Security to cost various scenarios of security equipment, specifically encryption devices, for securing the DLA unclassified data base network. The four devices incorporated in the SECURE model are: (1) The Low-cost Encryption/Authentication Device (LEAD), (2) the Protection of Logistical Unclassified Sensitive (PLUS) Information, (3) the Data Encryption Standard (DES) device, and (4) the KG-84 encryption device. A security scenario may be made up of any combination of these devices. The SECURE model was designed to obtain 10-year life cycle costs for different security scenarios. Each security scenario life cycle cost can then be compared against another.

DLA-91-P00118. Analysis of Air Force Vendor Shipments Originating in Index No. 91-27 Southern California and Destined for Hill AFB, UT (July 1991)

In early 1990 the Air Force made a decision to use the Regional Freight Consolidation Center (RFCC) in Los Angeles, CA, as a collection point for all of its vendor freight originating in southern CA and destined for the Air Logistics Center located at Hill AFB, UT. Since beginning use of the RFCC, several cursory cost analyses have been conducted which indicated that it would have been more cost effective to ship the materiel on a direct basis, thus bypassing the RFCC. This analysis attempted to do a more comprehensive cost analysis, taking into consideration some of the changes that have taken place since the Air Force began using the RFCC. The analysis shows that under the rate structure in effect during the September through April timeframe a net loss of approximately \$2,329 was experienced. However, if the new rates negotiated with Clearwater Trucking were in effect during this period, a projected savings of \$4,625 would have been achieved. Based on the new rate structure, it was projected that around \$10,000 annually could be saved.

DLA-91-P00116. Transportation Cost Analysis for EDDS Vendor Consolidation - Index No. 91-26 Jacksonville, FL (November 1990)

This report documents the results of a transportation cost analysis of vendor freight consolidation at the Jacksonville, FL, Enhanced Defense Logistics Agency Distribution System (EDDS) contractor operated facility for the 8-month

period ending 31 March 1990. The study is part of the continuing analysis of the EDDS implementation and operation. The study showed that during Aug 89 through Mar 90, vendor consolidation at Jacksonville, FL, saved approximately \$45,739 in transportation expenditures. This figure includes losses incurred during the initial start-up period. During the latest 3 months of operation analyzed, inbound tonnage averaged over 400,000 pounds per month while the estimated transportation savings were about \$11,300 monthly. Based on observed trends in the EDDS data for Jacksonville, transportation savings are expected to continue.

DLA-91-P00103. Termination for Convenience Decision Support Model
Index No. 91-25 (April 1991)

Contracts, purchase orders, and other procurement instruments can be terminated for material considered in excess to current requirements. This model determines, from an economic standpoint, whether termination is cost justified. The model compares the various costs of holding excess material to the costs associated with terminating a current procurement action and reprocurring at a later date. Using net present value cash flow analysis, the model determines which potential course of action (termination versus status quo) is the least cost to the government. The model is embedded within existing procurement systems and helps streamline the termination process.

DLA-91-P00097. Hazardous Material Analysis and Coding System (HAZMACS)
Index No. 91-24 (June 1991)

The Defense Logistics Agency is implementing a new hazardous material classification system consisting of 55 Hazardous Characteristic Codes (HCC). The HCC will provide critical information needed to effectively manage, store and ship hazardous materials. With implementation of the automated DLA Warehousing and Shipping Procedures (DWASP), DLA depot receiving personnel are required to assign the HCC if it is missing from pertinent documents. Without the HCC, the DWASP system will not assign a depot storage location. Because the new HCC must be assigned quickly and accurately, an expert systems approach offers a feasible and practical means for providing this support. Accordingly, the Hazardous Material Analysis and Coding System (HAZMACS) was developed. HAZMACS is a PC-based expert system which queries the user about the known characteristics of suspected hazardous material and assigns an HCC based on the user's responses. HAZMACS consists of a main knowledge base file which "chains" to any of 13 other hazard-specific knowledge base files. The expert system was developed with the VP-Expert software package and has more than 2,200 rules.

**DLA-91-P00070. Los Angeles EDDS Site Transportation Cost Analysis for the
Index No. 91-23 Pooling Phase July-December 1989 (October 1990)**

This is an analysis of the cost effectiveness of the Los Angeles Enhanced DLA Distribution System (EDDS) site in comparison with direct shipment to the customer. Pooling is defined as the consolidation of truckload shipments from the depots into large less-than-truckload lots for transshipment to the customer. Comparison of the cost of EDDS pooling at Los Angeles with the potential cost of direct shipment to the customer showed that during the second 6 months of operations (July-December 1989), the Los Angeles EDDS site has absorbed a loss of approximately \$82,000. Analysis showed that although shipments are being consolidated at a higher rate than the first 6 months, outbound shipment rates from Los Angeles EDDS site are still too high. Recommendations were made to increase the direct shipment performance at the depots, to eliminate from the EDDS program shipments to customers greater than 400 miles from Los Angeles, and to negotiate a further reduction in the EDDS outbound pooling rates to a level that is competitive with the depot's guaranteed traffic rates.

**DLA-91-P00062. On-time Performance of Shipments through the Los Angeles
Index No. 91-22 Regional Freight Consolidation Center (August 1991)**

The purpose of this study was to evaluate DLA's service to its customers after implementation of the Regional Freight Consolidation Program. The Los Angeles Regional Freight Consolidation Center (RFCC) is one freight pooling hub in the Regional Freight Consolidation Program, formerly known as the Enhanced DLA Distribution System. Results of the study showed that the Uniform Military Materials Issue Priority System (UMMIPS) standard of 95 percent on-time delivery (i.e. within 21 days) is not being met. Customers are receiving only 80 percent of their freight on time. The policy of the RFCC Program Office is: depots have a maximum of 7 days for pooling and delivery to the customer. The six primary DLA depots are not delivering 95 percent of their shipments to the RFCC within 14 days. However, the RFCC is delivering 98.9 percent of its pooled shipments to the customer within 7 days. It was recommended that the depots make additional efforts to reduce handling times for shipments to the Los Angeles RFCC if the UMMIPS service standard of 95 percent delivery with 21 days is to be satisfied.

**DLA-91-P00060. Cost to Establish and Maintain a National Stock Number
Index No. 91-21 (November 1990)**

With increased budgetary control being applied at virtually all levels of government operation, there comes a greater need for more accurate and realistic measures of system performance. One such measure is the cost incurred when a new National Stock Number (NSN) enters the Defense Logistics Agency (DLA) System. Another indicator is the cost required to maintain an existing NSN in the system per year. This latter measure can also be of use

when assessing savings from the elimination of unnecessary NSNs. System performance in the areas of NSN entry and NSN maintenance processes cannot be satisfactorily measured, because accurate item entry and maintenance costs for DLA NSNs do not exist. This study found that the marginal direct costs were approximately \$50 to enter an NSN, and \$250 to maintain an NSN in the DLA system for one year, based on FY 89 data.

DLA-91-P00043. Update for In-house Cost of Source Inspection (April 1991)
Index No. 91-20

The in-house cost of source inspection (DLA Project 7027, Cost of Quality - Source Inspection) was updated to provide a more current estimate to the Government of the cost of conducting a source inspection for contractors who have submitted deficient material in the past. It was found that, on average per contract, 5.7 hours of additional in-house staff-hours are required at a cost of approximately \$166 is required for source inspection.

DLA-91-P90272. Quality Effectiveness Sensing Technique (QUEST) Release 3.0
Index No. 91-19 (March 1991)

In an on-going effort, the Defense Logistics Agency (DLA) Operations Research and Economic Analysis Management Support Office (DLA-DORO), has developed and fielded versions of the Quality Effectiveness Sensing Technique (QUEST) Model for the Quality Assurance (QA) mission with Contract Administration Services. The report documents the logic, structure and code for QUEST Release 3.0. QUEST Release 3.0 measures the effectiveness of the contractor's QA operations by comparing the contractor's key indicators with those of similar contractors (or peers). Based on those peer comparisons and trends, an effectiveness score for each indicator is computed and a weighted average of all indicators produces a bottom line effectiveness rating. Release 3.0 incorporates the knowledge of quality experts in the weighting factors and program logic. The model was validated through a statistical test which compared QUEST Release 3.0 results with expert opinion on certain contractors.

DLA-91-P90053. Multiple Forecasting Techniques (December 1990)
Index No. 91-18

Currently the Standard Automated Materiel Management System (SAMMS) uses a single technique to forecast demand for all hardware items. SAMMS forecasts are being adjusted by supply center with locally developed forecasting programs and manual inventory manager intervention. Previous DLA studies have focused on finding a single technique to improve forecasting for all items. For example, a demand forecasting study of subsistence items has found that a set of four simple methods could perform better than the current subsistence forecasting technique. The purpose of this study was to define the criteria for a multiple forecasting model to operate in conjunction with the current

SAMMS system and data base. The multiple forecasting model developed optimally selects the most appropriate forecasting technique for each item.

DIA-91-P90040. PACKOOST Users Manual (March 1991)
Index No. 91-17

The PACKOOST Program is a PC-based automated tool for estimating the direct cost of packaging an item in accordance with MIL-P-116 standards. Both direct labor and material costs are included in the estimate. Material costs are obtained from an extensive database of packaging materials and prices developed for this program. By storing the data electronically and automating the price data retrieval and cost calculations, the program will greatly reduce the time and effort required to develop packaging cost estimates both in the depots and at contracting in the supply Centers.

DIA-91-P81117. Repair Versus Buy New Criteria
Index No. 91-16

DIA has maintained a significant volume of unserviceable assets coded as Condition F (reparable) and G (incomplete) and there has been no formal guidance for Inventory Managers in making repair/buy decisions. The purpose of this study was to identify the costs involved with repairing and procuring and to determine the logic involved for making consistent, economical, and timely repair/buy decisions and to incorporate these into a mathematical model. The model developed for the decision process documents the steps necessary to make such a decision. The supporting PC program utilizes limited historical data to estimate the minimum and maximum expected repair costs and the expected purchase cost of new assets. The report recommends that more unserviceable assets be considered for repair and that accurate collection and maintenance of the repair data and item status be pursued as preparation for future updates. It further recommends that the model eventually reside in SAMMS or the Automated Inventory Manager System (AIMS) where the alternative costs may be more accurately computed using current rather than historical data.

DIA-91-P81109. The REVIC Advisor (REVAD): An Expert System Preprocessor
Index No. 91-15 to a Parametric Software Cost Estimating Model
(September 1991)

Defense Contract Management Command (DCMC) engineers perform a Technical Analysis of a Cost Proposal (TACP) whenever a contractor submits a proposal in an environment of little or no competition. This environment applies to most weapons systems software proposals. The Department of Defense purchased an estimated \$34 billion of software embedded in weapons systems in fiscal year 1990. Tools are needed to assist DCMC engineers in performing TACPs involving software. REVAD, coupled with REVIC, provides a flexible analytical framework

from which the engineer may follow the analysis wherever it may lead. In addition to expert decision rules and an online software glossary, REVAD produces a complete report of the software cost estimating session, which the engineer may include in the TACP report. Favorable results from field testing point to the potential of huge savings from more effective TACPs involving software.

DLA-91-P81076. Bulk Stockage Location Study (June 1991)
Index No. 91-14.

This study was initiated to quantify operational costs associated with alternative stocking strategies. The specific objective was to explore potential alternatives which had the possibility of reducing total system costs while maintaining service levels to DLA's customers. The project was confined to the DLA original six depots since the project preceded the Department of Defense decision to consolidate DoD non-ammunition depots under DLA. The study found that there was a potential to save \$10.5 million (FY 88 dollars) annually since it was found that the Agency's 1988 stockage strategy of employing the DLA depot closest to the customer was not the most economical policy. Although this policy had been implemented to provide expeditious service to DLA's customers while also attempting to minimize second destination transportation costs within the Continental United States (CONUS), it had not considered the high cost impact of out-of-area shipments in support of high priority shipments. In reality, those costs frequently exceeded first destination transportation costs under the 1988 data employed by this analysis. Follow-on study efforts are being undertaken to address the broader DoD issues are being coordinated to provide the Agency with appropriate methodologies for evaluating stockage alternatives in a changing DoD environment.

DLA-91-P81066. Defense Depot Richmond, Virginia (DDRV) Connector Building
Index No. 91-13 Complex Design Simulation Analysis (December 1990)

This report presents the results of two simulation analyses of portions of the Connector Building Complex (CBC) being built at Defense Depot Richmond, VA. The Defense Logistics Agency (DLA) Depot Operations Support Office (DLA-DOSO), who developed the designs of the CBC, requested simulation of the less-than-truckload (LTL) packing area and of the Automated Guided Vehicle System (AGVS). The general purpose of the simulation analyses is to identify any problems or possible improvements. In addition, in the case of the AGVS, the study determined the number of vehicles required.

DLA-91-P81059. Transportation Cost Comparison (February 1991)
Index No. 91-12

This report documents a comparison of the Defense Logistics Agency's (DLA) current transportation rates to various rate schedules used in both the government and the private sector. Applicable transportation rate schedules were obtained from the General Services Administration (GSA), the Military Traffic Management Command (MTMC), and a nationwide motor carrier. Comparison transportation costs were calculated using actual shipment data and the applicable rate schedules. DLA's shipment costs were based on the actual transportation costs. Based on the results of this study, it is recommended that consideration be given to the possible expansion of the Government Traffic Program to include less-than-truckload shipments.

DLA-91-P81023. How DLA's Supply Performance Affects Air Force Readiness
Index No. 91-11. (October 1990)

This report is a description of work performed by the Logistics Management Institute under the direction of the DLA Operations Research and Economic Analysis Office. It establishes a link between DLA supply performance and Air Force readiness by projecting the number of additional aircraft that could be expected to be either partially mission capable-supply (PMCS) or not mission capable-supply (NMCS) as a result of a change in funding or performance. One of the central findings is that for the demand-based items in DLA's Weapon System Support Program, a one-time 20 percent (\$50 million) reduction in DLA wholesale safety levels would - through the increased depot delay that would impose on air force bases - render an additional 30 to 40 aircraft NMCS or PMCS beyond the roughly 1,300 aircraft already NMCS or PMCS at any given time among the total Air Force fleet of 9,100. Although the focus is on the Air Force, the results can be used to predict how DLA's wholesale performance is likely to affect aircraft and other end items in all the Services. The methods and results of the work also show that DLA can meet the central objectives of "secondary item weapon system management" - i.e., monitor its contribution to readiness and manage its supply operations to meet availability goals. Certain changes are recommended in the way DLA provides support to those items the Services have identified as applicable to important end items and weapon systems. By changing the way items are grouped to compute safety levels, simplifying the treatment of item essentiality, and initiating a program to obtain point-of-use demand data, it may be possible for DLA to achieve significant savings in safety-level investment while at the same time improving weapon system support.

DLA-XX-P81002. Defense Logistics Agency Integrated Data Bank (DIDB)
Index No. 91-10 Dictionary (March 1991)

This undated version of the Data Dictionary for the Defense Logistics Agency's Integrated Data Bank (DIDB) consists of file descriptions, file layouts, and

field information. The DIDB is a collection of tapes files that assemble historical data from DLA's inventory control points, its depots, the Defense Contract Management Districts, the Defense Reutilization and Marketing Service, the Military Traffic Management Command, and Military Supply and Transportation Evaluation Procedures System. The DLA Operations Research and Economic Analysis Management Support Office and DLA's Primary Level Field Activities Operations Research Offices use the DIDB to perform their studies. This dictionary serves as a reference document for DIDB users and others interested in DLA Operations Research work.

**DCMR-91-P00011. Threshold for Transportation Charge Review Cost Benefit
Index No. 91-09 Analysis (September 1990)**

Reviews of transportation charges on commercial bills of lading (CBL) are done as part of the Prepaid Transportation Program (PTP). The PTP calls for a transportation specialist to review each invoiced CBL transportation charge that is more than \$100. When this threshold triggers a review, the items invoiced and related shipping charges cannot proceed through the Automatic Payment of Invoice (API) system. Instead, the items are paid manually, and a second manual payment is done to pay the shipping charges after they are reviewed and approved. The added work involved in making manual payments and reviewing transportation charges is not always worthwhile. By comparing all costs associated with reviews to benefits derived, a more optimal transportation charge review threshold was determined to be \$190.

**DCMR-91-P00008. Maximization of Automatic Payment of Invoices (API) in the
Index No. 91-08 Contract Payment Function (September 1991)**

The Mechanization of Contract Administration Services (MOCAS) system pays contractor invoices automatically if data base information exactly matches corresponding invoice information. Invoices are paid manually if an error has been made anywhere in the data input process, or in cases where a decision (usually at the payment clerk level) is required to control expenditure of government funds. This study estimated that a manual payment costs \$20 more than if the payment was solely automatic. A Pareto analysis of frequency data developed for this study identified eight manual material acceptance and accounts payable record messages for in-depth cost benefit analysis. The results showed numerous manual payments could be avoided by implementing several, mostly minor, procedural and MOCAS system changes. Major changes involve recommending implementation of several electronic data interchange initiatives identified in the study. Implementing all the recommendations in this study would save DLA over \$10 million annually, as well as increase the speed and accuracy with which it pays contractors.

DCMR-91-P00033. Property Control System Analyzer Model (October 1990)
Index No. 91-07

Defense Contract Management Command (DCMC) property administrators (PAs) conduct surveys on Government property in contractor custody valued at \$45 billion. The surveys ensure that contractors use the property effectively and conform with Federal Acquisition Regulations (FARs). The Property Control System Analyzer (PCSA) model provides PAs with informed assistance on matters of policy and requirements. It standardizes data collection and guides the process based on the new DFAR Supplement 3. Also, because property quantities are often large, it helps PAs use and analyze samples to test contractor compliance. The PCSA model will enable PAs to do more thorough surveys which should result in significantly reducing the amount of lost, damaged, and destroyed property, and reduce instances of over-consumption. It will also provide greater management visibility over surveys.

DPSC-91-P10006. Minimum Sustaining Rate Study for Tray Pack Producers
Index No. 91-06 (August 1991) DPSC-RO Report

A Special Minimum Sustaining Rate (MSR) Study of the industrial base for tray pack operational ration component items was conducted. The MSR is the lowest monthly rate at which a plant can economically retain its production capability and critical skills and is used as part of industrial preparedness planning to insure the industrial base is sustained. The study focused on the economic and financial aspects of tray pack production. The primary objective of the study was to determine and measure the historical relationships between output levels, unit cost and return on investment. The information allows for the setting of MSRs that are sound given the economics of production, and therefore will help to guarantee that the industrial base continues as an economically viable source of tray packs.

DPSC-91-P10005. Evaluation of Current and Proposed Defense Subsistence Office
Index No. 91-05 (DSC) for Texas (May 1991) DPSC-RO Report

The purpose of this analysis is to determine whether the Defense Subsistence Offices (DSOs) located in the Fort Worth - Dallas area or the DSO located in San Antonio is more efficient and economical to serve all customers in the Texas area. The major cost elements analyzed were storage, handling and transportation costs. Although storage and handling data were available, transportation costs were only available for the current customers of each DSO. As no reliable cost data was available for either Fort Worth or San Antonio to service new customers, a regression model for transportation costs was developed using each DSO's actual transportation cost per 100 pounds (cwt) per mile for current customers. Using the model, prospective rates were developed for each new customer and their transportation costs were calculated. The analysis of major cost elements indicates Fort Worth should be the consolidated DSO site.

DPSC-91-P10004. DPSC: A Demographic and Performance Profile (May 1991)
Index No. 91-04 DPSC-RO Report

A study was performed to develop demographic profiles of the DPSC workforce. The main objective of the study was to provide a baseline for DPSC strategic planning with respect to workforce requirements. Part 1 of this report consists of summary observations developed from the workforce profiles. The observations on employee education levels indicate that short and mid range personnel planning should look toward changing the education profile, aligning it with the evolving changes planned for DPSC in general. Part 2 of the report consists of charts which provide views of the DPSC workforce differentiated and cross tabulated by sex, grade, job series, age, education, and years of service. Part 3 provides a performance profile of the workforce based on adjectival performance ratings given to employees during calendar year 1990.

DPSC-91-P10003. Analysis of Solicitation Methods Within Medical's Electronic Data Interchange Procurement System (April 1991)
Index No. 91-03 DPSC-RO Report

An analysis of the automated procurement system known as the Standardized Automated Materiel Management System by Electronic Data Interchange (SPEDE) was conducted. The analysis determined the affects of the solicitation method embedded in the system as well as alternative methods on performance measurements such as variability in award prices, manual intervention required for pricing reviews, and PALT. A simulation model was developed using data extracted from SPEDE. The results of the simulation analysis indicate that the solicitation method affects performance significantly. In particular, increasing the number of firms solicited returns substantial benefits. The recommended changes will provide a higher level of price stability and a substantial reduction in manpower required for manual intervention. These changes will result in annual savings in excess of \$2.7 million in prices paid.

DPSC-91-P10002 Economic Price Adjustment Formulas for Milk and Processed Milk Products (January 1991) DPSC-RO Report
Index No. 91-02

The analysis developed an economic price adjustment (EPA) formula to be used by DPSC to adjust milk product contract prices for changes in milk market conditions. The report details when and how the EPA should be applied for fluid milk. Along with fluid milk, DPSC solicits for processed dairy products such as cottage cheese, light whipping cream, half and half, sour cream and yogurt. Analysis shows that the Minnesota-Wisconsin (M-W) Manufacturing Grade Price Series provide a good basis for EPAs for these processed milk products as well as for fluid milk. These EPAs should be based on the "whole milk

equivalents" needed to manufacture the processed products. The report provides the recommended EPA factors for each product.

DPSC-91-P10001. Final Report on Acquisition Initiative Study (January 1991)
Index No. 91-01 DPSC-RO Report

This study predicted the possible effects of new acquisition strategies (initiatives) used by the Defense Personnel Support Center. The initiatives included the use of long term contracting instruments, source selection criteria, best value procurements, and commercial buying practices. The effects of initiatives were predicted by developing a mathematical model to simulate the processes of the various contracting methods. The analysis compares the quantitative measures of gross processing time (PALT) prior to the introduction of the initiatives and after their implementation for procurements in the Directorate of Clothing & Textiles during fiscal year 1989. Quality factors such as the occurrence of deficiencies and late deliveries, and the need for pre-award surveys were measured and costed out to determine savings as a result of the initiatives. Potential savings based on Clothing and Textiles procurement actions for FY89 ranged from several million dollars to \$40 million dollars for the three year life cycle of the initiatives. The analysis predicted PALT reductions of approximately 400 days over a three year period.

**DLA-90-C00181. Medical Acquisition Shelf-Life System (MASS) Decision
Index No. 90-33 Support Model Systems Documentation (Revised June 1990)**

The MASS model is a decision support aid used to assist procurement analysts in evaluating alternative bids for stocked medical shelf-life items. MASS attempts to identify the best value bid by balancing longer shelf-life against higher purchase price in order to identify the bid with the lowest life cycle costs. The objectives of this user's guide are to describe the model's features, instruct the user in using MASS, and explain the rationale of the model to vendors.

**DLA-90-P00165. Defense National Stockpile Holding Costs (May 1990)
Index No. 90-32**

This report documents the development of annual holding costs for the Defense National Stockpile (DNS) commodities. Three annual cost-to-hold factors are presented for use in analyses with different levels of specificity: a marginal cost-to-hold factor that would be applicable to a small portion(s) of the DNS, the selling or buying of which would impact only direct operating costs with no changes in space requirements for overhead costs; a total cost-to-hold factor that would be applicable for large scale changes that impact the overhead structure of the DNS; and a cost-to-hold factor for commodities that are currently excess which uses specific storage costs rather than an overall average. Based on the treatment of market gain, the actual holding costs for FY 89 were estimated to range from \$351.3 million to \$456.9 million.

**DLA-90-P00130. In-Depth Analysis of DoD IG Audit 8AC-0038 (April 1990)
Index No. 90-31**

This effort involved an analysis of the sampling methodology used by the DoD IG to survey material nonconformance rates at the Defense Industrial Supply Center. The DoD IG sampling plan was found to be valid, but there were significant discrepancies between the plan and the execution of the plan. Sampling problems were found with (1) the unit of measurement/unit of issue, (2) retesting bias; (3) defect classification bias and (4) confidence interval calculation errors.

**DLA-90-P00117. Transportation Cost Analysis for EDDS Vendor Consolidation -
Index No. 90-30 Chicago, IL (August 1990)**

This study encompassed a transportation cost analysis of vendor freight consolidation at the Chicago, IL, Enhanced Defense Logistics Agency (DLA) Distribution System (EDDS) contractor operated facility for the 11-month period ending 31 March 1990. The study is part of the continuing analysis of

the EDDS implementation and operation. The analysis showed that during the first 11 months of operation, vendor consolidation at Chicago, DLA saved approximately \$151,630 in transportation expenditures. This figure included losses incurred during the initial start-up period. During the last 5 months of operation, transportation savings were estimated to be \$170,282. Based on observed trends in the EDDS data for Chicago, IL, transportation savings are expected to continue.

DLA-90-P00111. Transportation Cost Analysis of Dallas, TX, EDDS Vendor
Index No. 90-29 Consolidation (May 1990)

This study entailed a transportation cost analysis of vendor freight consolidation at the Dallas, TX, Enhanced DLA Distribution System (EDDS) contractor operated facility for the 10-month period ending 31 December 1989. The analysis showed that during the first 10 months of operation, vendor consolidation at Dallas, TX, saved approximately \$85,024 in transportation expenditures. This figure includes losses incurred during the initial start-up period. During the last 3 months of operation, inbound tonnage averaged over 600,000 pounds per month while the estimated transportation savings were about \$35,000 monthly. Based on observed trends in the EDDS data for Dallas, transportation savings are expected to continue.

DLA-90-P00109. Defense Stock Fund Surcharge by Supply Center (July 1990)
Index No. 90-28

This effort involved an analysis the Defense Logistics Agency Office of Comptroller (DLA-C) methodology used to incorporate operations and maintenance (O&M) costs into the standard unit price. The study was undertaken as a result of Defense Management Review Decision 901/901C which dictated that O&M costs be included in the stock fund as reflected in the standard unit price. The DLA-C methodology used to distribute the O&M costs studied in this analysis was found to be basically sound and defensible. Some individual costs required redistribution, but no major efforts were noted. The analysis did, however, identify areas of interest which warrant further study.

DLA-90-P00107. Surface Versus Air Transportation Analysis (Automatic
Index No. 90-27 Downgrade Endeavor for the U.S. Navy, Air Force, and Marine
Corps (August 1990)

This is an analysis of the Defense Logistics Agency (DLA) Automatic Downgrade Endeavor. Under this program, the United States Navy, Air Force, and Marine Corps have permitted DLA to automatically downgrade Issue Priority Group/Transportation Priority I and II (IPG/TP I and II) shipments from air to surface transportation modes during a 1-year test period. The Automatic Downgrade Endeavor does not apply to Not Mission Capable Status (NMCS), Special U.S. Navy Project Codes, "999" Required Delivery Date (RDD) Shipments

nor any overseas shipments. This project evaluates the initial 6 months of the program for each Service. The analysis determined the total number of IPG/TP I and II shipment downgrades for each Service during the test period, the related processing and transit times for those shipments, the actual surface transportation costs of those shipments, and the associated transportation costs via an air freight carrier. These figures and the calculated cost differential between surface and air modes, which amounted to approximately \$16.4 million a year for these Services at existing levels of traffic and current rates, will be used to determine the feasibility of continuing the program. It is recommended that DLA continue with the Automatic Downgrade Endeavor and monitor system performance to determine if the dollar cost savings versus increased shipment times is cost effective in the future.

DLA-90-P00051. Integrated Materiel Complex (IMC) Personnel Savings
Index No. 90-26 Allocation Analysis (July 1990)

The purpose of this study was to derive an estimate of personnel savings attributable to the operation of the Integrated Materiel Complex (IMC) at the Defense Depot Mechanicsburg, Pennsylvania. The effects of four bin stockage policies were analyzed to determine how the IMC savings should be distributed among Defense Logistics Agency depots in the Eastern United States. Unit costs were used to translate expected workload changes due to these policies into changes in personnel levels at each depot. A net savings of 367 personnel equivalents due to IMC operation were identified, and the most equitable distribution of the savings among the depots was calculated.

DLA-90-P00004. DCMC Site Evaluation Analysis (March 1990) (FOUO)
Index No. 90-25

This effort attempted to quantify costs associated with the creation of the newly proposed command (DCMC) as part of the DMR Program. Associated with the creation of the DCMC are a number of potential configurations. These options were evaluated in this analysis from a cost perspective so as to include the various tri-service PROs and their respective contract administration responsibilities. It was found that establishing the DCMC with five-districts which incorporated the service PROs instead of copying the current nine region configuration would reduce operating costs by \$36 to \$48 million per year. Initial costs to change to the proposed five district alternative would range between \$22 and \$46 million depending on the site option selected. In addition, it was found that the individual districts' operating costs are relatively insensitive to the specific sites selected as the location of each district's HQs. Further major reductions in district cost are possible by reducing the mission and hence the staff of the HQs as well as by realigning DCASMA and DCASPRO within each district. However, the cost impact of shifting the mission responsibilities to the higher and lower echelon organization was not addressed in this study. Minor reductions in district costs are also possible by realignment of boundaries between districts. The

recommendation that has emerged is that analytical techniques should be employed, as part of the overall DCMC implementation strategy, to assist management in the restructuring of the DCMC MA/DCMC-PRO realignments within districts. This would serve to provide both a cost effective and operationally sound environment for absorbing the tri-service PROs.

DLA-90-P90271. QUEST II Field Enhancement (March 1990)
Index No. 90-24

A second release of the Quality Effectiveness Sensing Technique model was developed based on feedback from the first release (DLA-IO Project No. 3071). The new version incorporates an automated report distribution interface and a paperless version for supervisors with connectivity to the DMINS System. Minor improvements in the logic and effectiveness measurement process were programmed. Implementation support was provided by sending written guidance on the changes to all regional users of the model.

DLA-90-P90258. New York EDDS Site Transportation Cost Analysis for the
Index No. 90-23 Pooling Phase April - September 1989 (July 1990)

The purpose of this study was to evaluate cost effectiveness of the EDDS pooling operations at the New York Contractor-Operated EDDS site in comparison with direct depot shipments to the customer. According to the pooling concept, shipments generated at a depot for delivery to a common geographical area are combined into truckload lots for shipment to the EDDS site. At the EDDS site shipments from one or more depots are consolidated for transshipment to like destinations. The consolidated shipments are delivered short-distances, in larger, less-than-truckload or truckload lots to the ultimate customer. Several scenarios were presented and their respective costs calculated to demonstrate under what conditions the EDDS concept can generate savings at the New York EDDS site. Recommendations were made to monitor EDDS site operator performance to ensure that maximum consolidation occurs and to negotiate a reduction in the EDDS outbound pooling rates to a level that is competitive with the depots' Guaranteed Traffic Rates.

DLA-90-P90232. Nuclear Biological Chemical (NBC) Suit Requirements
Index No. 90-22 (March 1990)

The aim of this study was to examine DLA and the Service's Nuclear Biological and Chemical (NBC) suit requirements determination process and evaluate how they are applied to the Industrial Preparedness Planning Process. We found that Army had the most comprehensive system for determining NBC suit requirements. The other Services did not take into account as many factors as considered in the Army method. However, the Army considered a worst case global war scenario, in which all troops (to maximum strength) would be deployed, when determining the number of suits required. We recommended that

the Army method be used by all Services to determine NBC suit requirements, but a more realistic combat troop strength and battle engagement scenario be used as inputs. We also recommend that DLA's computations and associated assumptions be compatible with that of the Services.

**DIA-90-P90174. Transportation Cost Analysis of New York EDDS Vendor
Index No. 90-21 Consolidation (April 1990)**

A transportation cost analysis was performed of vendor freight consolidation of the Enhanced Defense Logistics Agency (DLA) Distribution System (EDDS) contractor operated facility at New York for the 6-month period ending 30 September 1989. The study is part of the continuing analysis of the EDDS implementation and operation. The analysis found that during the time frame reviewed, the vendor consolidation process at New York lost approximately \$78,310 due to the method of operation of the EDDS contractor. However, in November 1989 DLA recovered \$59,437 in overcharges from the carrier, making the new loss for the period \$18,873. Extensive sensitivity analyses were conducted and resulted in several recommendations for improvement of the current operation. It was found that through increased consolidation at the contractor's facility, savings should begin to accrue immediately.

**DIA-90-P90136. Administrators and Holding Costs Resulting from Processing
Index No. 90-20 Reports of Discrepancy (November 1989)**

The objective of this study was to quantify the costs incurred by DLA and other Department of Defense (DoD) activities as a result of the receipt of discrepant items from contractors and the resulting submission of Reports of Discrepancies (RODs). This report summarizes all efforts involved in the analysis and presents the results in tabular form for use by supply center contracting directorates.

Two costs resulting from the receipt of a discrepant item are quantified--the administrative cost and holding cost. The analysis showed that the expected administrative cost for actions that encompass ROD processing, investigation, and resolution is \$227 for a packaging ROD and \$189 for a shipping ROD for a typical item managed by DLA. The analysis also showed that the "average" holding cost per packaging ROD is 3.22 percent of the contract value for a typical DLA-managed item. The corresponding holding cost accumulated for a shipping ROD is 3.57 percent of the contract value. The sum of the administrative and holding costs represents a "minimum" total ROD cost. Administrative and holding costs were calculated for individual supply center and for items identified by Federal Supply Class.

DLA-90-P90123. Termination for Convenience Decision Support Model
Index No. 90-19 (September 1990)

Purpose of this study was to review existing policies and procedures for canceling or terminating excess procurements, and to determine under what circumstances it is cost effective to do so. This report summarizes the current cancellation/termination policies, and presents an analytic model which: (1) standardizes and streamlines the termination process; (2) provides visibility of depot storage and handling costs; (3) identifies candidates for economic termination; and (4) if implemented, would reduce the value of excess on-order material and avoid unnecessary storage and handling costs.

DLA-90-P90116. Order-Ship-Time Analysis of Pre-EDDS vs EDDS Performance
Index No. 90-18 (October 1989)

The Enhanced Defense Logistics Agency (DLA) Distribution System (EDDS) is being implemented to save funds by reducing transportation costs. Although cost reduction is important, DLA must also maintain a required level of customer service. In December 1988 the first EDDS site, located in Los Angeles, came on-line. Accordingly, there surfaced a need to gain insight into the impact of EDDS on service to customers in the Los Angeles region. In this study average delivery times were computed for both pre-EDDS data and EDDS data. Comparisons were made by branch of Military Service, by customer areas as defined by destination cross reference code, and by depot. Analysis shows that the average delivery time has risen from 13.0 days to 16.4 days with the implementation of EDDS in the Los Angeles region. This result is based on the first 3 months of EDDS implementation. It is not known at this time if this is representative of customer service under the EDDS concept.

DLA-90-P90108. Initial Transportation Cost Analysis of the Enhanced Defense Logistics Agency Distribution System (EDDS) Los Angeles Site
Index No. 90-17 (March 1990)

This report documents the preliminary results of a transportation cost analysis of the Enhanced Defense Logistics Agency (DLA) Distribution System (EDDS). The study compares actual costs incurred for outbound shipments through the Los Angeles EDDS site against the costs of those same shipments had EDDS not been implemented. The study did not consider inbound shipments in that vendor consolidation data was not available at the time of the study. Based upon available data for the first 6 months (December 1988 to June 1989) of operation, it was found that EDDS had incurred a loss of over \$200,000 at the Los Angeles site. However, the study also showed that had new, renegotiated shipment rates (as of 1 October 1989) been used, the Los Angeles site would have saved in excess of \$35,000, and, further, that increases in shipment consolidation show a potential for real dollar savings.

DLA-90-P90094. Enhanced Defense Logistics Agency Distribution System (EDDS)
Index No. 90-16 Freight Terminal Simulation Analysis (February 1990)

This report presents the results of simulation analyses of a proposed mechanization design of the freight terminal at each of the six Defense Logistics Agency (DLA) depots. The mechanization project is part of the Enhanced DLA Distribution System (EDDS), with designs developed by the DLA Depot Operations Support Office (DLA-DOSO). The purpose of the simulation analysis was to identify any problems to the proposed design, as well as possible improvements and recommended changes. Simulation results indicated that the efficiency of sort workers could be improved at all depots by adding another queue area for arriving pieces and empty pallets. Also, additional workstations were required at several depots for data collection, Medical Air Line of Communication (MEDLOC) processing, and palletization. Defense Depot Columbus, Ohio, required additional stretch wrap capability, while Defense Depot Memphis, Tennessee, needed an entirely new sorter design to improve efficiency. Additionally, it was found that sortlines and pallet conveyor lines could be shortened at four depots, reducing total costs by almost \$500,000.

DLA-90-P90091. Analysis of Automatic Downgrade of Army IPG I Transportation
Index No. 90-15 (May 1990)

This report documents an analysis of the Defense Logistics Agency (DLA) Automatic Downgrade Endeavor. Under this program, the U.S. Army has permitted DLA to automatically downgrade Issue Priority Group (IPG)/Transportation (TP) I shipments from air to surface transportation modes during a 1-year test period. The Automatic Downgrade Endeavor does not apply to not Mission Capable Status or other "999" required delivery date shipments nor any overseas shipments. This study evaluated the initial 6 months of the program from 1 February through 31 July 1989. The analysis determined the total number of IPG/TP I shipment downgrades during the test period, the related processing and transit times for those shipments, the actual surface transportation costs of those shipments, and the associated transportation costs via an air freight carrier. These figures and the calculated cost differential between surface and air modes, which amounted to approximately \$3.449 million a year at existing levels of traffic and current rates, will be used to determine the feasibility of continuing the program. The report recommends that DLA continue with the Automatic Downgrade Endeavor and monitor system performance to determine if the dollar cost savings versus increased shipment times is cost effective in the future.

DLA-90-P90045. Freight Terminal Modernization Cost
Index No. 90-14 Benefit Analysis (March 1990)

This report details the costs and benefits of modernizing the freight terminals at the six Defense Logistics Agency (DLA) depots. The current designs are not adequate to handle additional demands of unitization and increased throughput. The results of this study indicate that several alternatives are feasible and cost effective. The study also describes in precise detail the resources required to implement each alternative. Finally, the analysis shows that an investment in large scale material handling equipment would be the best course of action for DLA. Implementing this alternative would provide DLA with the ability to meet all processing goals and afford an opportunity to experience considerable transportation savings.

DLA-90-P90012. Establishment of a DLA Premodernization Cost Baseline
Index No. 90-13 (May 1990)

This effort was accomplished under contract by Deloitte & Touche for the Defense Logistics Agency (DLA). The objective was to define baseline Automatic Data Processing (ADP) and functional costs for Fiscal Year 1987 and to project these costs through FY 2010. To accomplish this, a personal computer based cost model was developed.

The model utilizes the Oracle database software and Oracle's link to Lotus 1-2-3 spreadsheet data. Cost data for all areas of DLA operations are extracted from the DLA accounting system. This data is stored on magnetic media and subsequently input into the Oracle database. Script files were developed to process the data into a useable form for various reporting purposes.

Allocation schemes developed to disaggregate rolled-up costs are built into the Oracle script files. Once the data is processed for a given year, future projections on operations may be made by exporting database information to Lotus 1-2-3 spreadsheets. Any "what-if" games executed in the spreadsheet environment have no permanent affect on the database data.

DLA-90-PS1123. Contractor Purchasing System Review Model (October 1989)
Index No. 90-12 DCMR-ID Report

Contractor Purchasing System Reviews (CPSRs) determine that the systems and practices used by contractors provide maximum protection to the government. They help ensure that contractors conform with public law, Federal Acquisition Regulations (FARs), contract clauses, and effective industrial purchasing practices. Contractors with over \$10 million in negotiated government contracts are reviewed. The Defense Logistics Agency (DLA) reviews over 600 contractors and completes about 500 CPSRs each year. The purpose of this project was to develop a smart laptop computer based model to assist region

analysts perform CPSRs. A knowledge based approach was used for several reasons. DLA has experienced difficulty hiring, training, and retaining purchasing analysts. CPSRs also require a vast amount of contracting knowledge. The system was designed to make applicability decisions and ensure the proper topic review sequence. The overall goal was to provide each CPSR analyst with informed assistance and to guide the review process.

**DLA-90-P81103. Relationship of Contract Workload to Mechanization of
Index No. 90-11 Contract Services (MOCAS) Transactions (April 1990)**

Traditionally, one primary indicator of workload at the Defense Contract Management Regions (DCMRs) has been the total number of contracts on hand for administration. During the past several years, the contracts on hand have grown considerably at each DCMR. Preliminary indications, based on workload analysis performed by the DLA Systems Automation Center (DSAC), are that the number of Mechanization of Contract Administration Services (MOCAS) input transactions (shipments, corrections, modifications and new contracts) and the size of the contract data base files do not increase in the same proportion. Thus, in projecting future computer capacity requirements, the number of contracts on hand is not necessarily a reliable indicator. Current thinking at DSAC is that the number of enter key depressions (EKDs) associated with a given contract data workload is the best measure for estimating computer sizing requirements. This study involved the development of a mathematical model that could be used to estimate the total number of EKDs based on the characteristics of the contracts being administered by the five smallest DCMRs. This model could then be used to determine the increase or decrease in the level of EKDs caused by a change in the number or mix of contracts being administered. Of several models tested, there are two reasonably good models for estimating the number of EKDS. One model grouped contracts by military service and is referred to as the Military Service Model; the other grouped contracts by commodity and is referred to as the Commodity Model. Both models have a good statistical fit. However, the Commodity Model performed significantly better during validation and is recommended as the better of the two models.

**DLA-90-P81079. Economic Analysis System for Microcomputers User's Guide
Index No. 90-10 (July 1990)**

The DLA Operations Research and Economic Analysis Office has developed interactive microcomputer software to help users structure and perform economic analyses. Named the Economic Analysis System (EASY), this software provides users with a management tool for economic decision making. EASY's menu-driven system automates various economic analysis processes, including organizing resource data, calculating economic indicators, and comparing and testing data. This software package is designed to run on IBM and IBM-compatibles having at least 284k of RAM. The only other software needed to execute EASY is DOS (version 2.0 or later).

DIA-90-P81050. Multiple Cost EOQ Study (December 1989)
Index No. 90-09

This study was performed by Synergy, Inc., for the Defense Logistics Agency (DLA). The object was to determine the feasibility and desirability of replacing DLA's current single cost Economic Order Quantity (EOQ) model with a multiple cost model. The product of the study was a multiple cost model tailored to the Agency's ordering and holding practices. The study also developed detailed cost to order information for use in the model and tested the effects of implementing the model with an inventory analyzer. The study concluded that the overall impact of a multiple cost EOQ model would be favorable and recommended its adoption.

DIA-90-C81037. Depot Traffic Analysis FY 88 (March 1990)
Index No. 90-08

The detailed classification and recording of transportation costs and related data are an integral part of the management and distribution of material throughout the Defense Logistics Agency (DLA) system. The ability to identify costs by shipping activities/defense depots and mode of shipment provides management with the information needed to monitor and, if necessary, adjust procurement, distribution, or transportation policies. Accordingly, the purpose of this analysis was to compare fiscal year (FY 87) transportation costs with those of FY 86. This analysis is a followup to the depot traffic analyses which were previously conducted for FY 82 through FY 86.

DIA-90-P81018. Impact of Competition on Quality (September 1990)
Index No. 90-07

This report details our analysis to determine if and in what manner competition might impact the quality of DLA-managed items. Specifically addressed were the quality patterns of items broken out from sole source to multiple sources and those items which reverted from multiple sources to sole source have changed. For the vast majority of items broken out to competition there were no recorded valid contractor-caused complaints from the Customer Depot Complaint System (CDCS) file and no recorded Quality Evaluation Program (QEP) actions. When complaints from the CDCS were present, the results were mixed. When QEP activity occurred, it was more frequent after breakout than before. Therefore, it appears that there were no measurable differences in the quality of items after breakout to competition.

DCMR-90-P00001. Organizational Modeling Program (User's Guide) (June 1990)
Index No. 90-06 DCMR-CHI-IO Report

The OMP is an enhanced version of the Position Management Application Program (PMAP) (DLA-IO Project 6014). OMP provides on-line data retrieval capabilities for designing and evaluating organizational structures. The OMP database consists of information from the Automated Payroll, Cost and Personnel System (APCAPS) downloaded to a microcomputer. It supports many types of database queries and generates many specialized reports which help analyze organizational effectiveness. It also designs and prints organizational charts.

DPSC-90-P90011. Hotelling's T Squared Test Statistic Model
Index No. 90-05 (December 1989) DPSC-IO Report

A common practice to ensure the reliability of subsistence contractor testing systems is to analyze contractor test data against Government test data. The results produced by these comparative tests are used as measures of reliability for contractor test procedures. When test variables are significantly linearly dependent, as in the case of fat and moisture tests on meat products such as bacon and pork sausage, Hotelling's T^2 Test is utilized. The purpose of this study was to provide a mechanism to test not only two variable problems as mentioned, but also a three variable problem as well. The model developed to do this is user friendly and only requires that data be input. Use of the computer to accomplish these difficult mathematical calculations will give DPSC Quality Assurance personnel a tool that provides quicker and more reliable evaluations.

DPSC-90-P90005. Medical Simulation Model to Compare SAMMS vs. ARQ
Index No. 90-04 Inventory Policy (Requisition Optimization Model)
(June 90) DPSC-IO Report

Over the past several years, DLA has been experiencing for medical items an increase in the number of backorders, and a corresponding reduction in supply availability. To alleviate this problem, the DPSC Directorate of Medical Materiel requested that Headquarters DLA authorize a test of a requisition policy to "optimize" the issue of assets for items at or near a critical stock position. The policy looks at issue priority group two and three requisitions and predetermines which will be filled and which will automatically go on backorder. IPG 1 requisitions continue to be treated exactly as in SAMMS. In this study, a simulation model was developed to compare SAMMS system processing of medical items to the proposed process. The model looked at results over a 5-year time period to determine if the optimization process might increase supply availability and decrease backorders. Results indicated that the optimization process, over time, is neither better nor worse than the SAMMS system. Rather than produce a consistent increase in supply availability and decrease in backorders, the optimization process

behaves more like an insurance policy that is there if needed. This insurance comes into play when the critical stock position has been breached and expected due-ins are delayed. In this scenario the optimization process is useful. However, if the due-ins are imminent, then backorder will be unnecessarily created.

DPSC-90-P00003. Analysis of Maximum Release Quantity (MRQ) Computation -
Index No. 90-03 Subsistence Semiperishable Items (October 1989)
DPSC-IO Report

This report presents an analysis of the current method used to compute maximum release quantities (MRQs) for subsistence nonperishable stocked items (MRQ). An MRQ is the maximum quantity of stock authorized for issue against a single requisition without an item manager review. It is used in the automated system to detect requisition quantities that may be excessive due to customer ordering errors (error requisitions) and therefore helps to insure that these quantities are not shipped. Testing of the current MRQ method indicated that the MRQ limits generated were generally too high allowing a high percentage of error requisitions to go undetected. An alternative method was tested which is based on the variance in demand for items. It detected substantially greater percentages of error requisitions than did the current method, while at the same time it performed comparably to the current method in minimizing the percentage of valid requisitions rejected. It is expected that use of this method, in comparison to the current method, will increase the probability that error requisitions will be detected.

DPSC-90-P00002. Analysis of Industrial Preparedness Methods - MRE Retort
Index No. 90-02 Pouch Items (February 1990) DPSC-IO Report

This study involved an analysis of the methods used to determine "maximum share quantity" eligibility levels for retort pouch meat procurements. Maximum shares refer to the maximum award quantity that a firm may receive. Awards for these items are restricted to firms participating in industrial preparedness planning in order to maintain a sufficient production base that can fulfill mobilization requirements. The objectives of the study included (1) a review of the current method of determining IPP objectives, and (2) an analysis of the relationships between the structuring of maximum share quantities, IPP objectives and procurement cost. Procurement data for previous purchases of retort pouches was used to determine the impact of changes in maximum share quantities on number of awards, number of firms receiving their maximum share, and the total cost of the procurement. Mathematical programming models were used to solve the bid evaluations needed to determine the impact of these changes. It is projected that the use of the method recommended in this report for structuring maximum share quantities will not only help to insure that the IPP objectives are met, but that they are met in a manner that should minimize cost and resulting in savings of procurement dollars.

DPSC-90-P00001. Liquidated Damages Assessments for Late Contractor
Index No. 90-01 Deliveries for Clothing and Textile Items (May 1990)
DPSC-IO Report

An evaluation of the liquidated damages cost calculation for late deliveries of Clothing and Textile (C&T) items was performed. Liquidated damages refer to the cost charged to contractors who deliver supplies after the contract delivery date. Costs associated with late deliveries are directly related to the impact of the late delivery on inventory levels due to changes in production leadtimes. These costs include additional investment and storage costs as a result of increased inventory levels. In order to determine the impact of a late delivery on inventory holdings, a simulation model developed for C&T by the Logistics Management Institute was used (DLA-89-P81092). The results of the simulations performed provided estimates of the additional investment and storage costs. Based on the simulation cost estimates, a method to derive the expected cost of a given late delivery was developed. A cost factor is provided that is used to determine liquidated damages based on the item unit cost, number of days late and number of units late. Use of this method will result in recapture of the estimated expected cost to the Government associated with late contractor deliveries. Assessments can be supported based on the statistical and mathematical analysis described in the report.

DLA-89-P90038. Response Time Analysis for DWASP III Mobile Communication
Index No. 89-41 Devices (June 1989)

Increment III of the DLA Warehousing and Shipping Procedures (DWASP III) includes switching the depot functions of stock selection, stowage, inventory, stock surveillance, and transportation over to a paperless system. This will be accomplished by using Mobile Communication Devices (MCDs) to link warehouse workers with the depot mainframe computer. The volume of transactions between warehouse workers and the mainframe computers affects the mainframe response time. This study was performed to determine the maximum allowable mainframe response time and the minimum required number of MCDs that would allow Defense Depot Memphis Tennessee to process a worst case workload in one shift.

DLA-89-P90059. Cost/Benefit Analysis Support for DAAS Modernization
Index No. 89-40 (May 1989)

This analysis was conducted to assess the economics of the proposed Defense Automatic Addressing System ADPE Replacement and Modernization Program (DARP).

The life-cycle incremental costs and benefits of the modular DARP concept were compared against those of three other alternatives: a static baseline (allowing for no workload increase); a modified baseline permitting normal workload increases; and a modernization concept featuring a singular architecture. The study showed dramatic net economic benefits for both modernization alternatives; the proposed modular DARP concept had the highest benefit-to-cost ratio.

DLA-89-P90056. FY 89 Stock Fund Reduction Analysis (March 1989)
Index No. 89-39

The Defense Logistics Agency's FY 89 stock fund budget was \$360 million less than the dollar value of sales for FY 88. This study was performed to analyze alternative strategies within the supply system for accommodating this budget reduction. Changes in certain requirements computations and the appropriateness of current demand bases used in forecasting demand were the primary alternatives addressed. Constraining buys to a maximum of 12 months will realize a near term reduction of approximately \$25 million. Achieving center goal reductions for shorter leadtimes could further reduce buy requirements up to \$100 million. Other alternatives offering higher potential savings are not near term solutions. Reevaluation of both the enhanced safety level program and current system procedures for updating the quarterly forecasted demand (QFD) could involve stock fund savings of up to \$500 million. The analysis was limited to those replenishment items forecasted to breach their reorder point within FY 89. However, the study highlights key areas affecting our stock fund requirements and those potential areas that could be used to improve the overall management of stock fund investments.

DIA-89-P81124. Industrial Preparedness Planning (IPP) Item Selection
Index No. 89-38 Indicator Model (January 1989) DPSC-IO Report

This project was initiated to develop an indicator applicable to the Medical Commodity to be used to assist in identifying and prioritizing items which should be planned under the Industrial Preparedness Program. The model is based on a method of ranking items called the Technique for Order Preference by Similarity to Ideal Solution, which was used to develop an IPP prioritization model for the hardware commodities (Index No. 88-08). The ratings are based on four attributes: risk level, production lead time, mobilization ratio, and D to P day. The output of the model is a listing of all items ranked according to their prioritization values. This model is expected to improve consistency in the IPP process, increase productivity by allowing IPP personnel to reduce the time required for selecting items and increase time spent on actual planning, and a general improvement of readiness in mobilization situations.

DIA-89-P81122. Contract Management Mobilization Staffing Planning Model
Index No. 89-37 (May 1989) DCASR-CHI-IO Report

The Defense Logistics Agency regularly plans for the staffing requirements it will need in case of mobilization. Consistently accurate planning has been difficult in the Defense Contract Administration Services area, particularly for the Contract Management function. An analytical model was developed in this project to help with contract management mobilization staffing planning. The model quantifies the resources needed to administer added procurement instruments, and those saved by doing only the essential functions. It consolidates data on Individual Mobilization Augmentees and DCAS personnel in the Reserves, as well as retirees that could return to work as rehired annuitants. The model redistributes personnel to other functional areas when necessary. It computes overtime after accounting for these changes to the work force. The number of people each region needs to hire in each contract management functional area is the final output of the model. The model will permit planners to do sensitivity analyses to test the impact of input variables on this outcome.

DIA-89-P81116. Modeling of MOCAS Phase II Batch Processing (December 1988)
Index No. 89-36

The Defense Logistics Agency (DLA) Office of Telecommunications and Information Systems, Automated Information Systems Development and Control Division is responsible for determining the computer resources necessary to support the Mechanization of Contract Administration Services System (MOCAS), which is used by DLA contract administration activities for daily management of over 392,000 contracts valued at \$290 billion. The recent Phase II implementation of MOCAS operates in two principal modes — a daily on-line

cycle, and a night batch cycle. With impending installation of Phase II at the larger Defense Contract Administration Services Regions, there was uncertainty as to whether the existing and planned computer resources would be sufficient to handle the workload. The primary purpose of this study was to develop a model to predict batch cycle run times at the larger DCASRs under MOCAS Phase II, and to confirm that the CPU and input/output devices would provide adequate batch processing service levels.

DLA-89-P81109. Technical Analysis of Cost Proposal (TACP) Expert System
Index No. 89-35 Feasibility Study (September 1988) DCASR-CHI-IO Report

This examination of the TACP process found that using Expert Systems technology could improve effectiveness. Field interviews with many technical specialists, and other research into the TACP process, provided the supporting information. A screening methodology, employed for this project, tested the feasibility of potential Expert Systems. It identified three suitable applications. An Intelligent Computer Assisted Instruction tool would guide novice technical specialists through the analysis of a sample case. An Expert System preprocessor would help set up an existing parametric software costing model. An Expert System primarily for price analysts would help decide when a TACP is needed.

DLA-89-P81106. Cataloging-Tools-On-Line (CTOL) Automated Information System
Index No. 89-34 (AIS) Economic Analysis (December 1988)

Current Defense Logistics Agency cataloging operations use a manual information system to prepare new item requests and maintain existing cataloging transactions. This economic analysis assesses the economic feasibility of replacing the current manual operations with a CTOL AIS as part of the Standard Automated Materiel Management System modernization. This analysis is an update of the original economic analysis which was performed in August 1986. (Report No. 87-02)

DLA-89-P81096. Cost/Benefit Support to Immediate Improvement Initiative
Index No. 89-33 (December 1988)

The DLA Standard Automated Materiel Management System (SAMMS) Immediate Improvement Initiative (I³) is a relational data-base concept which will permit incremental SAMMS enhancements in such areas as discrepancy processing, inventory accountability, recommended buy, and stock positioning. This cost/benefit analysis assessed and compared the incremental life-cycle costs and benefits of I³ against a status quo baseline and two intermediate alternatives featuring differing degrees of Critical Baseline Enhancement implementation for DLA's automated information systems. The analysis concluded that the SAMMS-I³ concept offers substantial net economic benefits.

**DLA-89-P81092. Simulating Clothing and Textile Operations at the Defense
Index No. 89-32 Logistics Agency (April 1989)**

This report is a description of the work performed by the Logistics Management Institute under the direction of the DLA Operations Research and Economic Analysis Office. The report provides a narrative description (Volume I) and PC SIMSCRIPT II.5 source code (Volume II) for a PC-based simulation of wholesale inventory management of clothing and textile (C&T) items as practiced at DLA. The C&T Simulation Model enables inventory managers and analysts to project and evaluate the potential effects of new inventory policies and operating methods. This interactive, menu driven model runs on personal computers and operates on C&T data extracted from standard DLA Supply Control Files. It provides estimates of how supply performance, inventory levels, and costs are affected by different operating policies and procedures, e.g., variable safety levels, matrix delivery schedules, procurement cycle controls.

**DLA-89-P81080. Materiel Readiness Support System (MARS) Interface
Index No. 89-31 Prompting Guide (Revised as of December 1988)**

The MARS System was developed as an analytical tool to evaluate DLA's support to materiel readiness. The Historical Supply Performance Program of the MARS system produces statistics that reflect DLA's historical, item-by-item supply performance to a weapon system and/or organizational unit. The Projected Supply Performance Model produces statistics that predict DLA's future support to selected item groupings under a variety of performance goals or budget allocations. The original documentation manual (Report No. 84-14, October 1984) was designed to serve as a user's guide which would enable system adaptation for decentralized users. The current manual incorporates recent enhancements to the MARS System and has been designed to serve as a reference guide of the system's analytical capabilities for both functional and technical personnel.

**DLA-89-P81078. Decision Support System for Resource Allocation Model
Index No. 89-30 (April 1989)**

In 1987, the Defense Logistics Agency (DLA) began investigating the benefits of incorporating Decision Support System (DSS) technology within the Agency. Efforts were begun to develop an operational prototype DSS to assist decision makers in allocating constrained resource dollars. Two optimization models were created: the Stock Fund Allocation Model, and the Commitment Dollar Allocation Model. The Commitment Dollar Allocation Model was used for integration into the prototype DSS as it was designed to answer the real time question of what items to buy and how much of each should be bought at this time. Testing results demonstrated that this optimization model provides supply availability projections equal to or greater than current operations

when funding levels are below the stated Standard Automated Materiel Management System requirements levels. The primary benefit of this model within the DSS is that it gives the decision maker an idea of the effect that reduced or delayed buys will have on an item and throughout the system as a whole. This report documents the mathematical models developed.

DLA-89-P81077. Medical Acquisition Shelf-Life System (MASS) Decision Support Index No. 89-29 Model Systems Documentation and User's Guide (May 1989)

The Medical Acquisition Shelf-Life (MASS) Model is a decision aid to assist procurement analysts in evaluating alternative bids for stocked medical shelf-life items. MASS attempts to identify the best value bid by balancing longer shelf-life against higher purchase price in order to identify the bid with the lowest life cycle costs. The Systems Documentation briefly reviews the model's features, documents the MASS programs, describes the MASS files, and explains the procedures for updating the MASS data. The accompanying User's Guide describes the model's features, instructs the user in how to operate MASS, and explains the rationale of the model to vendors.

DLA-89-P81067. Simulation of DDMT's Central Pack Area (March 1989) Index No. 89-28

Defense Depot Memphis Tennessee (DDMT) has for a long period of time operated with packing areas in many parts of the depot. That concept has changed recently and they are consolidating operations as much as possible to take advantage of the associated economies. In addition, the requirement to upgrade and add on equipment to support the introduction of the DLA Warehousing and Shipping Procedures presented the opportunity to effect the consolidation. This plan materialized in the form of the DDMT Central Pack design for less than truckload (LTL) packing and bin packing operations. The purpose of this study was to perform a computer simulation of the proposed design to determine if goal throughputs could be met and to make recommendations on system improvements and modifications. This report documents the results of the simulation effort. In the LTL packing area, the simulation found three areas of concern: the small freight offer mezzanine, the small freight divert, and the multi-pallet packing area. Similarly, in the area of bin packing operations, the model showed that workload for the two input orientation stations was imbalanced, and that the multi-line packing area was greatly underutilized. Based on the simulation, specific recommendations were to increase system capabilities and to improve operation productivity.

DLA-89-P81064. Receipt Processing Time Study (January 1989)
Index No. 89-27

This analysis provided summary information to DLA Depot Operations on depot receipt performance based on historical files received from the DLA Depots. Distributions for each of the components making up the entire receiving and returns were analyzed using days required for processing. No general trend in total processing time (receipt to storage) was apparent.

DLA-89-P81061. Forecasting Infrequent But Predictable Demands (July 1989)
Index No. 89-26

The Defense Logistics Agency manages some items that generally experience little or no demand. These demands are occasionally interrupted by larger demands. This study was performed to identify and categorize those items that have definite "lumpy" demand patterns, quantify the magnitude of the effect of these demands on the managing commodity's supply availability, and determine the feasibility of attempting to forecast future behavior of these items. "Lumpy" items were identified and analyzed as two distinct groups of seasonal and non-seasonal items. Approximately 6 percent of stocked items with demand can be classified as seasonal. Seasonal items tend to increase the commodity's overall supply availability and have a relatively low stock position both in terms of stock to demand ratios and stock investment. These items did not have any distinguishable stocked items; however, under the concept of Multiple Forecasting, they do lend themselves to relatively simple forecasting techniques. The analysis of Defense Industrial Supply Center items experiencing "lumpy" but non-seasonal demand resulted in an unmanageable number of distinct categories making any kind of pattern analysis impractical.

DLA-89-P91043. Origin Stop-Off and Commercial Rate Analysis of Containers
Index No. 89-25 Bound for Northern Europe (February 1989)

This analysis covered potential consolidation through origin stop-offs of seavan containers and an evaluation of commercial rate levels. The analysis covered 2 months of seavan container data obtained from the Military Traffic Management Command (MTMC). Additional data covering actual shipping points for selected shipments was obtained from the Transportation Division, Defense Personnel Support Center (DPSC). It was determined that underutilization of seavan containers, whether it is based on weight or cube, is not a widespread problem for containers controlled by DPSC to northern Europe. In addition, it was determined that the current method of routing under the Military Sealift Command Shipping Agreement and Rate Guide offers substantial savings over commercial rate tariffs.

DIA-89-P81033. Optimal Weight Break for Minimum Freight Charges (April 1989)
Index No. 89-24

The purpose of this study was to review the less-than-truckload (LTL) minimum freight category of the Guaranteed Traffic Program (GTP) to determine whether or not carriers' rates were skewed upwards; if this was found to be true it was requested that an optimal weight break point be determined. Two approaches were used to investigate the LTL minimum freight charges. The first method was to do charge comparison. Two comparisons were performed: one using the discounted Military Traffic Management Command (MTMC) Class 100 Standard Baseline Rates and the second using carriers' Government discounts on the commercial rates published by a nationwide carrier. The first comparison showed that the GTP charges were 33.04 percent lower than the discounted MTMC charges. The second comparison indicated that the GTP charges were 40.57 percent less than the discounted commercial charges. The second approach was an application of linear regression. The regression model, based on the average rate per hundredweight per mile of the other LTL weight categories, predicted a higher average rate per hundredweight per mile than was obtained from the actual shipment data. The conclusion of both approaches is that there is no evidence that rates for the LTL minimum freight category are skewed upwards. The determination of an optimal weight break point was found not feasible because of the dynamic nature of the GTP agreements, in which carriers can adjust their rates in response to changes in the conditions of those agreements.

DIA-89-P81031. Issue Priority Group (IPG) Three Shipment Consolidation
Index No. 89-23 Effectiveness Model (May 1989)

This report summarizes the work done and conclusions reached in a study of depot low priority shipment consolidation effectiveness. IPG III requisitions for compatible items and with the same destinations are consolidated to make maximum use of transportation and warehousing funds. This process is highly automated, but frequently the oldest requisition is removed from the shipment data bank before the routine drop date. The resulting consolidation is thus smaller than it would have been under ideal conditions. The model constructed for this study emulates the consolidation process. The optimization of the consolidation process assumes a perfect system, but can still be a useful tool in determining effectiveness trends at the Defense Logistics Agency supply depots. For a typical depot in a 45-day period, this model shows that under optimal conditions, small parcel shipments could be reduced in excess of 63 percent.

**DLA-89-P81022. Prototype Expert System for Hazardous Material Identification
Index No. 89-22 and Classification (May 1989)**

DLA is implementing a new hazardous material classification system, consisting of 55 Hazardous Characteristic Codes (HCCs), which will provide critical information needed to effectively manage, store, and ship hazardous materials.

Under the new system, depot receiving personnel will be required to assign the HCC if it is missing from pertinent documents. Because the HCC must be assigned quickly and accurately, an expert system approach appeared to offer the best means of assisting depot personnel in performing this task. Accordingly, the purpose of this project was to determine if an expert system approach to assigning HCCs is feasible. A prototype expert system was developed which has the capability of assigning ten HCCs to a specific category of hazardous materials. Subject to the results of field testing at DLA depots, the prototype system demonstrated that it is feasible and advisable to develop an operational system for the assignment of hazard codes.

**DLA-89-P81020. Meals, Ready-to-Eat (MRE) Decision Support Model
Index No. 89-21 (December 1988)**

The MRE Decision Support Model is a set of software programs developed for a microcomputer with the overall objective of providing increased management visibility of DLA's MRE program. It consists of a set of user friendly software programs which use LOTUS 1-2-3. The programs will automatically convert basic MRE industrial preparedness planning (IPP) and procurement data to usable formats, assist the manager to perform the required analyses and present the results. The optimization portion of the package uses "What's Best!", a commercially available linear/integar programming (LP) package which utilizes LOTUS 1-2-3. The MRE Presentation Spreadsheet is the portion of the overall model that provides MRE program status and background information, allows "What If?" analyses and presents summary results of various optimization trials. The final documents consist of the User's Guide for the Presentation Spreadsheet and the Programmer's Guide which provides detailed documentation for all computer programs developed under this project.

**DLA-89-P81014. Analysis of Recommended Buy Output Control System (REBOCS)
Index No. 89-20 Data (July 1989)**

This report describes an analysis of recommended buys (RBs) generated by the DLA Standard Automated Materiel Management System (SAMMS) at four DLA supply centers. The purpose of the study was to gain a better understanding of the RB review process and to assess the actions taken by DLA inventory managers in approving, canceling, or modifying RBs. In addition, it was believed that the actions of inventory managers on certain groups of RBs might reveal statistical relationships which could be expressed as implicit rules applicable to the overall RB review process. Such rules could, therefore, be

incorporated in a prototype Inventory Manager Assistant expert system which was being developed at that time. The study revealed that inconsistent review procedures among the inventory managers led to numerous and unnecessary repetitive RBs. Accordingly, no implicit rules for use in the expert system could be identified.

**DLA-89-P81012. Administrative and Holding Costs Resulting from Processing
Index No. 89-19 Reports of Nonconforming Supplies (July 1989)**

The Packard Commission recommended that the Government conduct its purchasing operations in a fashion similar to that of the private sector, by emphasizing quality and schedule in addition to price. The Defense Logistics Agency's Directorate of Contracting is examining the possibility of quantifying the costs associated with poor contractor performance and incorporating these costs into the bid evaluation process. In support of this effort, a project was initiated to evaluate the cost associated with nonconforming supplies that are attributable to contractor fault. This study examined two elements of the cost of nonconforming items, specifically, the administrative cost and the holding cost. The administrative cost arises from actions normally performed at various supply and staff levels (internal and external to DLA) when a nonconforming item is discovered and a Quality Deficiency Report (QDR) is initiated, processed, investigated and resolved. The holding cost results from the storage and handling of nonconforming items and from the lost opportunity of investment for money "tied up" in these discrepant supplies. The average administrative cost accumulated for a single QDR for a typical DLA item was found to be \$501. The average holding cost per QDR was estimated as 3.55 percent of the average contract value for a typical DLA item. The administrative costs (in dollars) and holding costs (expressed as a proportion of the contract value) were derived for various levels of detail, that is, Federal Supply Class, Federal Supply Group and supply center.

**DLA-89-P81011. Cost of Late Delivery (December 1988)
Index No. 89-18**

A previous project (Index No. 87-26) developed a methodology for estimating the costs incurred by DLA as a result of a late delivery. This methodology was validated using DGSC as a test case. This current project extended the cost estimating methodology and developed cost estimates for each of the Federal Supply Classes at all DLA hardware centers. These costs are recommended for incorporation into the bid evaluation process in order to buy for best value.

DLA-89-P81010. Forecasting Contracting Workload (April 1989)
Index No. 89-17

This study explored the possibility of forecasting DLA contracting workload from indicators of Service activity. The premise of this analysis was that DLA's contracting workload is somehow related to Service activity — an increase in Service activity will lead to a corresponding increase in DLA workload. In this effort we examined the use of regression analysis and mathematical modeling for forecasting DLA workload. It was determined that DLA's contracting workload could not be forecast directly from Service activity. We were able to forecast DLA's Supply Operations workload (expressed by item demand) from Service activity in some cases. We could then forecast some of DLA's stocked item contracting workload indirectly by using the forecasts of item demand. However, it was not possible to forecast any of DLA's non-stocked contracting workload.

DCAS-89-P90001. Disbursements Forecasting Model (June 1989)
Index No. 89-16 DCASR-CHI-IO Report

DLA now uses the unit cost method of resourcing DCASRs. The dollar value of disbursements is the cost driver. As a result, actual and forecasted disbursements are now a critical element in workyear planning. DLA's current method is an adjustment of the prior year disbursements for estimated inflation. This project, however, uses two techniques, linear regression and time series analysis, to predict disbursements. The regression model projects disbursements using the budgeted DoD procurement outlays which cause disbursements. Then, it averages the two results to arrive at a forecast. The study produced projections of disbursements for the next fiscal year for DLA and for each of the nine DCASRs.

DGSC-89-P90003. Defense General Supply Center Employee Motivation Study
Index No. 89-15 (Vol I), Defense Depot Richmond Virginia Motivation Study
(Vol II) (September 1989) DGSC-IO Reports

The final results of a motivation/productivity study conducted at DGSC/DDRV are contained in these two reports which document the statistical analyses of a set of questionnaires administered to 447 DGSC/DDRV employees. The questionnaires were developed and administered by an ad hoc working group. The results of this study provided some realistic indicators of the employees' motivational climate at Defense General Supply Center and Depot in Richmond, VA, at the time of the survey.

DGSC-89-P90002. Economic Analysis of the Hazardous Material Building Complex
Index No. 89-14 (July 1989) DGSC-IO Report

Currently over 100 Federal Stock Classes of items, identified as hazardous materials, are stored at Defense Depot Richmond Virginia (DDRV). In addition, DDRV also stocks around 732,000 cubic feet of petroleum products in 55 gallon drums. These drums are currently stored in the open posing a potential environmental hazard. For both efficiency and safety, a complex of handling and storage facilities has been proposed. This report documents, in detail, the engineering costs of the proposed facilities; the operational procedures or processes which would be affected; and the economic analyses performed.

DGSC-89-P90001. DGSC Operations Center Economic Analysis; Supplement: DGSC
Index No. 89-13 Operations Center Commercial (December 1988) DGSC-IO Report

First proposed in 1986, the Operations Center is conceived of as a facility meeting an increasing Inventory Control Point workload in a modernized environment. In addition to its own staff, DGSC must accommodate several hundred DLA tenants currently located at the center. The report details the engineering concepts, operational benefits, and economic model, as well as the resulting actual cost/benefit calculations.

DPSC-89-P90007. Initial Analysis of the Producer Price Index for Bakery Items
Index No. 89-12 (September 1989) DPSC-IO Report

An initial analysis of Producer Price Index (PPI) data was performed to determine if the magnitude in raw material cost increases due to the recent drought have a significant effect on prices of bread. The analysis was limited to the potential impact on the price of white bread as caused by increases in the price of wheat grain and wheat flour. Twenty months of PPI data, January 1987 through August 1988, for wheat grain, wheat flour, and white pan bread were analyzed to ascertain if there is a statistically significant relationship between the price of wheat, wheat flour, and white bread and if this relationship alone could be used as an economic price adjustment factor for white bread. From the analysis it was concluded that price changes in wheat grain, as caused by the recent drought, are neither a good nor sufficient reason to expect significant price changes in white bread.

The drought and its subsequent impact on wheat prices is not sufficient justification to conclude that bread vendors require immediate relief from their contract responsibilities.

**DPSC-89-P90006. Rice Demand and Production (March 1989) DPSC-LO Report
Index No. 89-11**

The Directorate of Subsistence has experienced significant increases in the demand for two NSNs for par-boiled rice while at the same time has had difficulty in procuring the NSNs. The Contracting and Production Division therefore requested an analysis of the situation and an outlook for 1989. Based on an analysis of demand, pricing and production data, it seems that the difficulty in procurement of the two NSNs was probably due to a variety of factors including: increasing and extremely variable demand; relatively low level of available stocks; substantial increase in price; and the relatively low level of non-U.S. stocks (due to decreased production) placing pressure on U.S. stocks. The study projected an outlook for 1989 better than what occurred during 1988. Though DPSC demands are expected to increase substantially based on operations research forecasts, U.S. production is expected to increase by 23% with stock levels increasing by 20%. Given that demands represent such a small percentage of U.S. utilization, it was concluded that there should be adequate supplies.

**DPSC-89-P90005. Adaptive Robust Estimation (August 1988) DPSC-LO Report
Index No. 89-10**

The Quality Assurance Division of the Directorate of Subsistence is responsible for evaluating the reliability of contractor testing systems under the DPSC Subsistence Contract Optional Testing Clause. To ensure the reliability of these testing systems, contractor test data is analyzed against Government test data. The results produced by these analyses are used as measures of reliability. The statistical method utilized by the Quality Assurance personnel to test for this reliability is called Adaptive Robust Estimation. The technique has recently been improved by work done at the University of Iowa. The effort documented in this report involved the interpretation, design, and programming a new set of equations developed at Iowa. As a result of these updates, Quality Assurance personnel are able to provide quicker and statistically more reliable evaluations.

**DPSC-89-P90001. Central Supply Point Distribution Model (November 1987)
Index No. 89-09 DPSC-LO Report**

The objective of this project was to determine the most economical method for distributing low demand items. The model was developed for end-users and is therefore self contained and menu-driven. A series of Lotus 123 worksheets containing menus, data, appropriate formulas and look-up tables, and report generators comprise the system. Output is in the form of decision support tables which allow item managers to analyze the economic feasibility of two alternative methods of shipping a specific item to a specific customer. Data requirements include location of origin and destination points, appropriate transportation rates, and handling and storage costs. The model compares

transportation, storage and handling costs for the two alternative distribution methods. One method is to ship a small quantity of an item directly to a customer; the other is to ship a large quantity of the item to a central distribution point where it is consolidated with other items and then shipped to the customer.

DPSC-89-P90003. Integer Programming Complex Bid Evaluation Model
Index No. 89-08 (December 1986) DPSC-IO Report

The purpose of this effort was to determine the low cost award solution for complex evaluations. A user friendly, menu driven PC model was developed to assist procurement personnel in performing complex bid evaluations. A series of Lotus 123 worksheets containing menus, data input screens, and report generators are interfaced with a mathematical programming package. The Lotus component allows users to input bid data and output award solutions. The math software generates optimal solutions based on bids and constraints. The evaluations are complex due to the restriction that a single line item quantity be totally awarded to a single vendor, yet each vendor has production capacity limits in terms of overall quantity. The evaluation is performed as a large zero-one integer programming problem with up to 900 variables and 60 constraints.

DPSC-89-C90009. Kaiserslautern Cold Store Simulation Model (May 1988)
Index No. 89-07 DPSC-IO Report

The Kaiserslautern Cold Storage Facility, one of two cold storage warehouses in the Federal Republic of Germany, stores and issues perishable subsistence products for Troop Issue and Commissary resale. In order to better understand facility management policies, and to determine the potential effects of future inventory management policy changes, the DPSC Operations Research and Economic Analysis Office was asked to develop a model of the Kaiserslautern operation. A Monte Carlo simulation model of over eight hundred perishable chill and freeze items was developed to emulate the Kaiserslautern operation. It analyzes the impact of various inventory management policies on supply availability and warehouse space. It provides management with an analytical tool that can be used to examine current inventory policies and the effects of van detention. It provides a baseline analysis for determining the cost/feasibility of increasing supply availability, and the warehouse space required to do so, as well as an analysis of how many vans per week will incur detention costs, and how increases in warehouse space will affect the number of vans charged detention. Using the model, one can determine the cost of increasing supply availability or obtaining more warehouse space.

**DPSC-89-P90004. Product Quality Audit Program (January 1989) DPSC-IO Report
Index No. 89-06**

One of the management tools utilized to implement the Quality Audit Program is the depot audit program. Results of the audits for FY 87 and 88 indicate that the percentage of nonconformances (failed depot quality audit inspections) for the commodities managed by the Defense Personnel Support Center are the highest in DLA. A study was undertaken to ascertain the range of the nonconformance problem. The results show that the range of nonconformances expected versus those actually documented by the limited data available differed substantially. Therefore, additional testing was done utilizing revised Acceptable Quality Levels (AQLs). The results came closer to documented nonconformances, but indicate that further study should be conducted as more data becomes available. The study recommended that the AQLs currently being used be tested for statistical reliability; the quality process be reviewed to ensure that the Government is receiving the product that it is paying for; the reporting process be standardized; inspectors be assigned one commodity; and more communication take place between the various Government agencies involved in the quality process.

**DLA-88-P88021. Cost of a Preaward Survey (June 1988)
Index No. 89-05**

A preaward survey is one tool used by a contracting officer to determine contractor responsibility. The purpose of this study was to quantify the costs incurred by the Defense Logistics Agency in performing a preaward survey, in an attempt to incorporate this cost into the bid evaluation process when the apparent low bidder has a questionable performance history. The cost would more closely reflect the true cost of doing business with the apparent low bidder. This analysis was divided into two parts. The first part of the analysis examined the direct costs of a preaward survey. These costs were primarily the expenditure of labor to perform and track a preaward survey. The second part of this analysis involved quantification of the costs associated with the delay in awarding the contract due to the preaward survey.

The costs were identified in the increased safety levels resulting from increased lead times. The costs of a preaward survey were found to be significantly different, depending on whether a formal or an informal preaward survey was accomplished.

**DLA-88-P88014. Depot Resourcing Model, Users Manual and Tutorial (June 1989)
Index No. 89-04**

The Depot Resourcing Model is a personal computer model designed to provide the manager at work center level or the Director of Distribution with the least cost personnel configuration required to accomplish projected workload. The model determines the optimum mix of permanent employees, temporary

employees, part-time employees, intermittent employees and overtime hours using productivity rates established by the manager, wage rates, performance standards, and either minimum or maximum percentage restrictions placed on the labor types by the manager. The primary purpose for developing the model was to reduce unit cost. If a depot can get the workload accomplished with a large number of intermittent employees, the depot has the flexibility of not calling that employee to work if the workload does not materialize. There are also savings on fringe benefits for those intermittents that do work. The manual and tutorial provide instructions and examples for using the model.

DLA-88-P83008. IMC Candidate Items and Storage Aid Requirements
Index No. 89-03 (September 1988)

DLA is building an Integrated Material Complex at Defense Depot Mechanicsburg Pennsylvania to handle approximately 15,000 requisitions in an 8-hour shift. In 1986, this office performed an analysis of candidate items to aid in the design process. This study was to provide an update to that analysis due to stockage policy changes in DLA. Two scenarios concerning the replenishment policy were considered. The first scenario allowed for no replenishment and up to four of the largest rack locations for item storage. The second scenario's goal was to maximize the throughput by use of a variable replenishment policy. Finally, we combined the storage location requirements for the active items with those of dead items to calculate the total location requirements.

DLA-88-P81048. Buyer's Assistant Expert System Prototype (September 1989)
Index No. 89-02

This project was undertaken in cooperation with the 7th Communications Group, Air Force Communications Command, as a technology demonstration of Artificial Intelligence applications in logistics. The Buyer's Assistant is an expert system which was developed at the Defense Fuels Supply Center (DFSC) to assist DFSC buyers in selecting the appropriate clauses for a contract solicitation. This expert system, which is currently in use at DFSC, will query the buyer for information about the "buy," and then use this information to select the required clauses for a given bulk fuel procurement. It will then automatically collate and print the appropriate clauses in a format suitable for inclusion in the completed solicitation.

DLA-88-P81013. Optimization of Defense Reutilization and Marketing Office
Index No. 89-01 Locations (September 1988)

The DLA Defense Reutilization and Marketing Offices (DRMOs) are responsible for the worldwide disposition, reutilization, and sale of excess/surplus Government property. This report describes the application of operations research techniques to determine the optimum number and location of DRMOs in

order to minimize overall cost to the Department of Defense. The study identified 22 DRMOs or off-site branches as candidates for consolidation and/or closure. However, due to certain study assumptions and constraints, it was recommended that the study results be viewed as a "pointer" to those sites which should be considered for further study.

88-22. Analysis of Variable Quarterly Forecast (September 1988)

The Defense Industrial Supply Center (DISC) is the only Center that uses a Variable Quarterly Forecasted (VQF) Support by Supply Management Category Codes (SMCC) methodology as a tool to manage their resources. DISC experiences lower supply availability than the other DLA Supply Centers (DSCs). This analysis was initiated to determine what impact the VQF methodology has had on costs and performance at DISC. Based upon a comparative assessment between the SAMMS requirements determination process and the VQF methodology, the VQF requires lower investment costs to achieve the same overall system performance as SAMMS. Lower supply performance at DISC is not attributable to their use of VQF, but appears related to funding and operational constraints. Due to the DISC impact on overall DLA performance, increasing performance at DISC would improve the overall performance of DLA. Primary consideration should be given to reassessing and evaluating the constraints under which DISC is currently operating. (DLA-LO Project 8026)

88-21. Inventory Manager's Assistant, Expert System Prototype (July 1988)

The Inventory Manager's Assistant (IMA) is a tool to help the Inventory Managers make recommendations for the buys which are presented to them on a Standard Supply Control Study. The purpose of the program is to evaluate the information on the Control Study being investigated, updating information such as the Quarterly Forecasted Demand (QFD) and Recommended Buy Quantity. IMA will accomplish this by reading in the information from a Control Study in the form of a data file, processing the information required and making calculations for the new quantities to be used, and outputting the information to the user. The output to the user can be in the form of a data file or displayed to the computer screen for inspection and user interaction. The IMA documentation describes the installation, operation, and maintenance of the IMA program. The document has been written for the novice computer operator with little experience with operation of IMA and computers. The target computer for IMA is the DMINS machine, a UNIX based computer used by the Defense General Supply Center (DGSC). (DLA-LO Project 7049)

88-20. Simulation of Packing Area Throughputs Under DWASP (June 1988)

This report details the results of a simulation of the Defense Logistics Agency Standard Warehousing and Shipping Automated System (DWASP) Increment II for Defense Depot Ogden, Utah (DDOU). The system under study included the printing of the Issue/Release Receipt Document (IRRD), packing, and offering to transportation for bin operations. In addition to these functions, all associated hardware such as conveyors, automatic sealers, bar code readers, and printers were modeled as well. The analysis indicates that there were two major areas for concern--the multiline packing and the single line offer stations. In the packing area, there was an imbalance in the work among the packers. Specific recommendations in packing include alteration of the current scheme for assigning work to multiline packers and placing a cap on

the maximum size shipping unit. In the offer area the original configuration could not accomplish the required throughput. The addition of another diversion belt and splitting up the offer function into three components performed in different areas resolved the problem. (DLA-LO Project 6034)

88-19. Enhanced DLA Distribution System (EDDS) - "Pooling" (June 1988)

This study looked at the "pooling" concept as proposed under the EDDS. "Pooling" assumes movement of selected freight from a depot in truckload lots to an intermediate EDDS facility for consolidation with freight from other DLA depots. The resulting larger less-than-truckload shipments are then transported from the EDDS facility short distances to the ultimate consignee. The study compared current transportation methods and costs to the "pooling" alternative, and computed estimated savings. Savings under "pooling" in second destination transportation expenditures were estimated to be \$16.9 million yearly. In addition, a depot weight/line analysis was conducted and initial traffic studies were developed for the proposed commercial EDDS facilities at New York, NY, and Los Angeles, CA. Several conclusions are discussed and a recommendation is made to implement the "pooling" phase of the EDDS program. (DLA-LO Project No. 7020)

88-18. Economic Feasibility of DLA Materiel Maintenance Mission (June 1988)

The purpose of this study was to determine the economic feasibility (profitability) of DLA's materiel maintenance mission. Specifically, this study examined the economic feasibility of stock maintenance operations. The study results showed DLA's maintenance operations to be generally economically sound. The yearly net economic value generated, compared with the value of the assets employed, represented a rate of return greater than 10 percent. It was estimated that the total economic benefits generated during Fiscal Year 1987 were \$32 million, the total economic costs were \$26 million and the value of the assets employed was \$26 million. Because of the questionable validity of some of the data used for this analysis, it was recommended that, before any decision is made which would make major changes to the size or scope of the operations, an additional analysis should be made using more reliable historical data. The primary recommendation of the study was to modify the Job Order Tracking and Management System used by the stock maintenance operations to allow the generation of this valid historical cost data base. (DLA-LO Project No. 7033)

88-17. Assessing the Feasibility of Developing an Automated Method to Approximate Price Using Item Characteristic Information (June 1988)

The information currently most readily available to Defense Logistics Agency (DLA) buyers and price analysts to assist the pricing effort is based upon historical data, i.e., what has been paid in the past for the same item. This is valuable information but not adequate in all situations, such as during the procurement of new items or when conditions have drastically changed. Thus, this project was undertaken to investigate the feasibility of using item technical characteristic data to estimate prices. The approach taken was to attempt the development of a data base which would group items by specification technical characteristics. Unfortunately, it was found that the ranges in prices across most grouped items were too broad to be useful in the pricing function. The basic conclusion of this effort was that it is currently not feasible to use the existing data bases of item characteristic information to effectively assist in price reasonableness determinations. (DLA-LO Project No. 8006)

88-16. Modeling Energy Consumption in the Defense Logistics Agency (May 1988)

Goals for energy consumption at each of the Defense Logistics Agency managed facilities are affected by factors which are beyond the control of the organization and can vary from month to month, such as weather conditions and workload. This report presents the results of an analysis that mathematically modeled energy consumption and then attempted to use these models to assist in setting consumption goals for the agency. The DLA facilities identified the factors which they considered to be predictors of energy consumption. Three years of monthly data were submitted for each factor. The data were screened to identify possible problems and to determine which factors had some relationship with energy consumption. Regression models were developed to predict total consumption, electric consumption, and non-electric consumption at each location. These models showed a definite relationship between weather and workload factors and energy consumption. However, the models were not accurate enough to be used to set consumption goals in DLA due to the impact of extraneous factors that were not quantifiable. (DLA-LO Project No. 7009)

88-15. Analysis of Quality Assurance (QA) Effectiveness (April 1988)

The lack of meaningful measures of effectiveness for the Quality Assurance function within the Defense Contract Administrative Services (DCAS) has been a serious deficiency for many years. With the availability of new, automated data from the QA Management Information System, these measures are made possible through the QQuality Effectiveness Sensing Technique (QUEST) model. QUEST evaluates both the government-driven Contract QA Program and the contractor-driven product conformance through a set of indicators using multi-attribute decision-making methods. These techniques combine quantitative statistical analysis with subjective factors provided by QA experts. The model provides a relative measure of program and product effectiveness by comparing scores for a particular facility (contractor) with its peers' scores. Facility peer groups are established in terms of commodity, QA provision and size. The model was successfully tested by comparing QUEST measures with supervisor's opinions throughout DCAS organizational elements. (DLA-LO Project No. 3071)

88-14. Depot Traffic Analysis FY 86 (April 1988)

This report documents an analysis of DLA Depot Traffic for FY 86. Summary statistics for FY 86 are compared with similar data for FY 84 and FY 85 to determine the effect that the Guaranteed Traffic Program has had on transportation cost reductions. The data are compared based on both current dollar value and FY 84 dollars. For the purpose of this study, FY 84 data were considered as the base line. Significant cost reductions from FY 84 to both FY 85 and FY 86 were noted. In terms of FY 84 dollars, there was an approximated \$20 million cost reduction for FY 86. These savings are attributable to the lower rates negotiated under the Guaranteed Traffic Program and the associated increase in average weight per shipment and decrease in the total number of shipments. The study concludes that cost reductions achieved under the Guaranteed Traffic Program have significantly contributed to DLA's overall traffic management effectiveness. This program should be continued and expanded where possible. Efforts for greater consolidation should continue to be stressed. In addition, the study recommends that small air parcel rates be examined for possible additional cost reductions.

88-13. Evaluating the Sampling Procedures for Clothing and Textile Items
(March 1988)

This report evaluates the current acceptance sampling procedures for selected clothing and textile items. A simulation analysis was undertaken to examine the current sampling procedures and acceptance criteria, as specified in MIL-STD-1490D, to determine if they contributed to the problem of men's dress coats being accepted at the manufacturer's location and subsequently found to fail the same acceptance standards at the depot. The study concludes that the current sampling procedures and acceptance criteria are not the cause of the acceptance of poor quality coats. The study recommends that some minor adjustments to the sampling process be further examined. (DLA-LO Project No. 7005)

88-12. Accountable Property Study (March 1988)

This study attempted to determine the appropriate dollar value of equipment that should be recorded on property books for control. Costs to record and maintain an item on the property book and to perform periodic inventories were determined. It was not feasible to determine quantitative benefits. Therefore, the analysis provided a table of values based on probability of loss that would allow determination of an item dollar value for break-even between costs and benefits given a selected probability of loss for the item or class of items at hand. (DLA-LO Project No. 7041).

88-11. Improving Navy Supply Availability (March 1988)

When comparing DLA supply support to the Services, Navy Supply Availability (SA), as computed by DLA, was lower than the other Services'. The tasking was to determine why this was the case. Our research found that Navy supply points past requisitions to DLA that could not be filled. These were past as A4s. Normally, A4 requisitions succeeded the A0 requisitions for replenishment. When the SA for the item was computed, A4s are included. The number of units requisitioned per A4 is much lower than for an A0. SA is computed as the total number of requisitions filled over the total received, regardless of quantity requested or supplied. Consequently, A4s tend to lower the computed SA, but the actual support, if A4s were excluded from the computed SA, would match if not exceed the other Services'. (DLA-LO Project No. 7045)

88-10. Artificial Intelligence/Expert Systems (AI/ES) Technology Insertion
at the Defense Logistics Agency (January 1988)

This report was prepared by the Battelle Memorial Institute, Inc., documenting their effort to identify Expert System applications that can be implemented in DLA in the near term. Battelle identified five potential applications, ranging in size from a lap-top microcomputer system for field use by contract administration personnel to a supermicrocomputer/minicomputer application in supply operations. Battelle began with interviews in HQ DLA, and then performed multiple interviews with DCSG, DDCO, DDRV, DBTC, DCASR-CLE, and DCASMA-Dayton personnel. Thirty-six potential applications were screened in increasing levels of detail, ultimately culling out all but the five recommended development efforts. Some of those systems screened out should be revisited as additional information becomes available in their respective subject areas. The reason for screening out candidates was to ensure that Expert System technology was suitable and necessary, as opposed to more conventional programming or manual techniques. Recommended applications were:

Contractor Purchasing System Review (Contract Administration)
Quality Assurance Pre-Award Survey (Contract Administration)
Pre-Award Monitor Desk Survey (Contract Administration)
Packaging Design (Transportation)
Standard Supply Control Study (Supply Operations)

88-09. Analysis of DISMS Increment IV (January 1988)

This report brings together in one document the findings of a series of three studies concerned with Increment IV of the Defense Integrated Subsistence Management System (DISMS). This evaluation of Increment IV spanned more than 15 months and progressed from a general overview to more in-depth examinations of the two major Increment IV processes. Each analysis, in turn, has provided a different perspective on DISMS and revealed new, more detailed, information. In some cases, changes to previous study findings have resulted. Although two of these studies have been reported on previously (87-14 - DLA-LO Project No. 6039, DISMS Workload Capacity Study (Apr 87) and 88-05 - DLA-LO Project No. 7007, DISMS Bid Response Evaluation Analysis (Oct 87)) it is believed that this report provides the best assessment now available relative to the impact of Increment IV on Defense Personnel Support Center computer and personnel resources. Accordingly, this report replaces previous reports on DISMS Increment IV prepared by the DLA Operations Research and Economic Analysis Office. (DLA-LO Project No. 7026)

88-08. DLA Industrial Preparedness Program (IPP) Item Selection Indicator
(December 1987)

The purpose of this effort was to formulate a management indicator that provides visibility of the ability of the production base to meet surge and mobilization production needs. This report documents an effort to develop a prototype indicator which may be used to aid in the selection of items for planning as part of the Industrial Preparedness Program (IPP). The prototype planning indicator is based on the criticality of an item to its application and the uncertainty of availability for an item. Results from a test using the prototype indicator to evaluate the Construction, Electronics, General and Industrial commodities are presented. The prototype indicator shows much promise for identifying items which should be planned to ensure their availability during mobilization. The study recommends that development of the planning indicator be continued, to provide the Defense Logistics Agency's Supply Centers with a better methodology for the selection of items for participation in the IPP planning process, and to provide visibility of the responsiveness of the industrial base to meet emergency demands. (DLA-LO Project No. 6008)

88-07. Optimal Weight Limit for Less Volume Traffic (October 1987)

This report documents an analysis of the optimal weight break point for less than truckload and truckload traffic. The analysis examined the cost and transit times for shipments originating at DLA defense depots and destined to points in the Continental United States. Data were obtained from the Freight Information System file for FY 85. Comparisons were made of total cost and total transit time for four different workload weight policies. These comparisons determined the trade-offs between cost and transit time associated with these policies, the relationship between cost and transit time, and the relative ranking of the policies. Finally, the policies were evaluated and

ranked based on the trade-off relationships between cost and transit time. These relationships were identified and a recommendation made that the findings be validated by the Guaranteed Traffic Program bidding process. (DLA-LO Project No. 6013)

88-06. Analysis of Shelf-Life Stockage Policies (October 1987)

Effective management of shelf-life inventories requires a balance among procurement, receipt, holding, and disposal costs while maintaining high supply availability. Current DLA stockage policies maintain high supply availability, but often generate excessive inventories and a corresponding expiration of the shelf-life. The purpose of this study was to determine if current shelf-life stockage policies could be modified to reduce total operating costs while maintaining or improving current levels of supply availability. A validated stochastic simulation was used to model the current and alternative stockage policies for DLA shelf-life items. The results indicate that for hazardous items, the direct delivery with a cap on the reorder point is the best alternative for both cost and supply effectiveness. When direct delivery is not possible, the next best alternative is to establish a minimum buy quantity with a more conservative stockage objective and limits on economic order quantity and returns. For nonhazardous items, the direct delivery with a minimum buy quantity and a cap on the economic order quantity is the best alternative. When direct delivery is not possible, establishing a minimum buy quantity with a more conservative stockage objective, a reduced economic order quantity considering disposal costs and limits on safety levels and returns is the next best alternative. (DLA-LO Project No. 6011)

88-05. DISMS Bid Response Evaluation Analysis (October 1987)

Increment IV of the Defense Integrated Subsistence Management System (DISMS) was the subject of a previous study by the DLA Operations Research and Economic Analysis Office (see 87-14 - DLA-LO Project No. 6039, DISMS Workload Capacity Study (Apr 87)). That study indicated that a large bid response transaction volume could create unacceptably high and concentrated demands on the DISMS computer. The purpose of this study was to perform a more detailed study of the DISMS bid response process. The major finding of this follow-on analysis is that the previous study overestimated the transaction volume for the bid response process. However, the study also concludes that a large portion of this workload will be concentrated in a much shorter time period than was previously assumed. As a result, user acceptance problems may result due to the additional time and effort that will be required to record vendor offers into DISMS. (DLA-LO Project No. 7007)

88-04. Forecasting DCAS Workload Indicators (October 1987)

The purpose of this study was to determine if indicators of future levels of contract workload can be forecasted using quantitative techniques. Current forecasts involve, in most cases, "Professional" estimates employing the qualitative judgments of experts. Two types of quantitative forecasting techniques were used in this study: time-series analysis which uses historical data to predict future patterns and regression analysis which attempts to quantify the relationship between variables thought to be logically linked. DCAS workload indicators were divided into three groups: "Traditional" indicators (Contract Receipts and Contracts On-hand), "Contractor Driven" indicators (Contractor Purchasing System Reviews, Contractor Employee Compensation Reviews, Overhead and Cost Monitoring Reviews, and Spare Parts Pricing Cases), and "Support Function" indicators.

(Preaward Surveys, Pricing Cases, Property Control System Surveys, and Technical Analysis of Cost Proposals). Based on this analysis, it was found that forecasts of Contract Receipts can be derived from regression analysis using DoD Procurement Outlays and Military Personnel Endstrengths. Forecasts for Contracts On-hand can be based on a time-series technique known as Winter's Method. "Support function" indicators are forecasted using a time-series technique known as Autoregressive Integrated Moving Average (ARIMA). "Contractor driven" indicators could not be forecasted because of insufficient historic data. (DLA-LO Project No. 7004)

88-03. Capability to Ship Direct to Overseas Customers (October 1987)

The purpose of this study was to analyze DLA's demand patterns for European customers and determine if enough traffic existed to warrant developing the capability to build container loads for direct shipment overseas. The analysis was limited to evaluating IPG II and IPG III requisitions for consolidation into direct shipments of material from DLA depots at Mechanicsburg, PA (DDMP), and Memphis, TN (DDMT), to customers in Europe. The study concluded that: (1) the demand patterns for DDMP were not sufficient enough to support a container consolidation operation, (2) DDMT has sufficient demand to support at least two customers (Mainz Army Depot and Central Receiving Activity, Pirmasens, Germany), and (3) development of a DLA container consolidation operation at DDMT would not adversely effect the operation of the Army's Container Consolidation Point at New Cumberland, PA. (DLA-LO Project No. 6017)

88-02. An Economic Analysis of Tape Cartridge Subsystems (September 1987)

This study report documents the results of a cost benefit analysis of new data storage and retrieval technology. The study includes economic data from Headquarters Defense Logistics Agency as well as from data processing installations within DLA. Three acquisition alternatives were considered in addition to the status quo. The results showed that one of the three alternatives would generate significant operating-cost savings to DLA; however, the new technology is far too expensive at this point and no working models of two of the three alternatives has been field tested. The study concludes that acquisition of new cartridge management technology should not be made at this time. The technology acquisition should be deferred until a track record is established and a corresponding price decrease occurs. (DLA-LO Project No. 7034)

88-01. Depot Effectiveness IPG III Processing (July 1987)

The purpose of this study was to analyze the effectiveness of IPG III MRO processing by measuring days and lines for four time periods: depot workload bank, days in depot processing, days in transportation hold, and days in transit. The analysis found that a very small percentage of lines remain in transit. The analysis found that a very small percentage of lines remain in transit. The analysis found that a very small percentage of lines remain in transit. It was recommended that (1) all four areas for the authorized standard time. It was recommended that (1) all DLA depots adhere to the standards as much as possible, (2) that the depots maximize consolidation of MROs in the bank, (3) that the depots identify items which have no potential to achieve consolidation cost effectiveness and pull these out of the bank early for shipment, and (4) that the depots allow large items to reach maximum maturity in the bank for maximum consolidation. (DLA-LO Project 6037)

87-26. Analysis of the Cost of Late Contractor Delivery (September 1987)

This study examined the costs of late vendor delivery for items managed at the Defense General Supply Center (DGSC). The study addresses the direct costs of late delivery which includes the labor and material expended in the attempt to resolve the situation, and the indirect costs which include the maintenance of increased safety levels of material because of increased lead times. The cost of a typical late delivery to DGSC has been quantified by this analysis to approximately \$11 in labor and materials used to expedite delivery, and \$314 in increased safety levels and maintenance costs. These costs of late delivery represent approximately six percent of the typical replenishment contract cost. The report suggests two possible applications of these cost factors - one during the bid evaluation process and the other to assess liquidated damages. (DLA-LO Project No. 7003)

87-25. Asset Search Pattern for DRMS MILSTRIP Requisitioning System
(July 1987)

The objective of this project was to determine the transportation cost savings that could be achieved by changing the search algorithm presently used in the Defense Reutilization and Marketing Service (DRMS) mechanized MILSTRIP requisitioning system. The current system chooses the best assets to fill a requisition, whereas the proposed system selects the closest acceptable assets. Transportation costs were calculated for each routine by using actual requisitions from the first four months of the system's use. A transportation cost savings of approximately two percent would have been achieved for the requisitions used in the analysis with the proposed search algorithm. The quality of the assets being shipped would decrease only slightly with the proposed routine. The study recommends that this new routine be implemented if the expected cost savings is great enough to offset the cost of recoding the computer program. (DLA-LO Project No. 7006)

87-24. Provisioning Policy Study (July 1987)

This project examined a number of alternative policies for buying and supporting provisioning items. Actual (historical) data was used in conjunction with a model of the inventory and provisioning systems. A statistical comparison of outcome measures, such as the total dollar of commitments and the number of backorders generated, was used to assess the alternative provisioning policies. The results of the study identified several policies which significantly reduced the dollar value of inventory, and others which significantly reduced the number of backorders. In general, the provisioning policies evaluated demonstrated an inverse relationship between commitments and assets on the one hand and backorders on the other hand. Two particular policies were identified which slightly increased the dollar value of commitments and assets, but significantly reduced the number and dollar value of backorders. (DLA-LO Project No. 5017)

87-23. Cost of Quality - Source Inspections (July 1987)

The purpose of this study was to estimate the additional cost to the government resulting from the use of mandatory source inspections in lieu of destination inspections for contractors who have a history of submitting quality deficient material. This report provides this estimate and documents the analytical process used. For the contracts of interest to this study, it is estimated that an average, 5.7 hours of source inspection time and 1.1 hours of contract administration time would be required. If the contract has been inspected at the source, approximately .2 hours of depot inspection are avoided. The average net cost to the government is approximately \$150 per contract. Factors which can influence the average cost in order of decreasing importance are commodity (FSC), dollar value of the contract, and DCAS Region. (DLA-LO Project No. 7027)

87-22. Binnable Stockage Locations (June 1987)

This study involved the development of a model to evaluate alternative stockage policies for binnable items. The purpose was to determine if transportation cost savings could be realized by stocking binnable items at fewer DLA depots. The analysis looked at six single depot stockage alternatives and fifteen dual depot alternatives. These stockage location alternatives were compared to the actual system based on the respective costs associated with receiving and shipping these items as well as the incurred transportation costs. The major factor in the total cost model was found to be the depot operating cost. The effects of consolidating the receipts and shipments at one or two depots appear to provide substantial cost savings over the current system, ranging from \$9.7 million to \$13 million per year. (DLA-LO Project No. 6033)

87-21. Impact of Competition on Contract Delinquencies (June 1987)

The purpose of this study was to analyze the impact of recent legislative policy changes in the procurement process on DLA's contract delinquencies. This report documents and summarizes the efforts and conclusions reached in the resultant study. The overall results of the delinquency statistics indicate that competition does not appear to be driver of delinquency. Competitive large purchases generally had a higher delinquency rate and a longer delinquency duration than sole source large purchases. However, items which were broken out from sole source to competition had mixed results for delinquency rates and shorter delinquency duration after a breakout. This mixed pattern of behavior can be partially explained by the fact that competitive contracts had more restrictive delivery schedules than sole source contracts. Findings also showed a downward trend in the average delinquency duration for both large and small purchases since 1984. (DLA-LO Project No. 6030)

87-20. DLA Enhanced Distribution System Follow-up Analysis (May 1987)

The objective of this study was to locate the best sites for potential consolidation points under the Enhanced DLA Distribution System concept and to determine the best number of points to ensure adequate coverage at the highest possible dollar savings. A site selection algorithm was developed using a

heuristic approach known to produce near optimal solutions. Use of the heuristic method enabled us to use a finite-set approach which selected the best sites from a set of pre-selected possibilities. Site selection was based on minimizing the transportation distance, weighted by demand quantities, from the vendor origins to the potential sites. Three scenarios were tested: (1) the best site scenario based on the unrestricted configuration of the site selection model; (2) a modified site scenario constructed manually by using the results of the best site scenario and checking the sensitivity of moving the Philadelphia, PA, site to Mechanicsburg, PA, and the Birmingham, AL, site to Memphis, TN, and (3) a depot site scenario locking the six DLA depot sites into the solution. Results indicated that the best solution was scenario (1) with an annual savings of \$14.6 million. Scenario (3) generated the lowest return at \$13.8 million.

87-19. DLA Warehousing and Storage Automated System (DWASP) Economic Analysis (May 1987)

This report documents an economic analysis of DWASP. The objective was to quantify and compare life cycle DWASP costs and benefits. The analysis time horizon was 11 years (FY 1988-98). Since the decision has already been made to implement certain DWASP increments, this analysis focused on DWASP Increments II through V. The analysis provides total (undiscounted) life cycle costs for the remainder of DWASP, total (undiscounted) life cycle benefits, and total present value (discounted) life cycle costs and benefits. In addition, a savings to investment ratio and a discounted payback period are determined. The economic justification for DWASP is insensitive to major cost escalations and benefit reductions. (DLA-LO Project 6028)

87-18. Variable Safety Level Analysis for C and T (May 1987)

This analysis examined four alternative methods to compute safety levels for the Clothing and Textile (C&T) commodity. The study analyzed the effect on costs and system performance of changing from a fixed to a variable safety level computation for all C&T items. Based on the analysis, immediate use of a variable safety level for all C&T items was recommended in that it would significantly reduce safety level dollar while maintaining virtually no deterioration in supply availability. (DLA-LO Project No. 7011)

87-17. Economic Analysis Support for Automated Information System Control Board (AISC) Working Group, Part II, Procedural Guidelines for Performing AIS EAs (May 1987)

These procedural guidelines were developed to provide a standard approach to performing economic analyses for Automated Information Systems (AISs). The purpose was to assist the AISC in the Integrated Priority List decision process. The procedural guidelines provide guidance in the performance of an economic analysis for a proposed modification to an existing AIS, or for the development of a new AIS. Also, the guidance contains procedures for both preliminary type economic analyses and more detailed analyses. It defines elements of project life criteria, cost requirements, discounting costs, life-cycle costing, sensitivity analysis, and identifying benefits. (DLA-LO Project No. 6024)

87-16. Analysis of DLA's GFM/CFM Policy for the Clothing and Textile Commodity (May 1987)

This analysis contributed to an overall review of DLA's Government Furnished Material (GFM)/Contractor Furnished Material (CFM) policy for the Clothing and Textile commodity by evaluating the impacts on prices and leadtimes from the use of GFM. Several thousand buys where the same approximately 700 items were procured both with and without GFM were examined in this analysis. The expectation that the use of GFM would always result in a lower overall cost to the Government was disapproved by this analysis as in more than half the buys, the cost was actually greater using GFM than CFM. GFM buys tended to have longer administrative leadtimes, but had much shorter production leadtimes resulting in shorter overall leadtimes as would be expected. The overall conclusion was that from the standpoint of prices and leadtimes, the use of GFM should be determined on a contract-by-contract basis.

87-15. Secure Telephone Requirements Analysis (April 1987)

This study consisted of the collection, compilation, and analysis of STU-III telephone requirements. The use of STU-III telephones had been previously proposed in order to protect against the interception of sensitive but unclassified information through nonsecure telephone conversations. The survey provided information on the volume of telephone calls currently made on unsecure telephones involving identified sensitive or vulnerable topics. STU-III requirements were estimated based on degrees of coverage and numbers of calls by directorate, by subject area. A range of options were provided based on the number of sensitive calls per phone per day and the percent of sensitive calls covered. (DLA-LO Project No. 7025)

87-14. DISMS Workload Capacity Study (April 1987)

The DLA Integrated Subsistence Management System (DISMS) provides on-line computer support to Defense Personnel Support Center (DPSC) subsistence management activities. Phase IV, now in design, will provide on-line support to contractor bid evaluation. The purpose of this study was to assess the transaction workload associated with this increment in order to determine appropriate computer sizing. Specifically, the study identified the types and frequencies of online transactions expected with implementation of DISMS Increment IV. Transaction data developed during this study provide a reasonable estimate of the workload resulting from Increment IV. This data indicates that the workload may exceed that presently posed by Increments I-III, combined. The Defense Systems Automation Center (DSAC) will use this data to determine the appropriate computer size to address the workload. (DLA-LO Project No. 6039)

87-13. Motor Carrier Cost Per Mile Analysis (April 1987)

This report documents an analysis of the cost per mile for motor carriers. The analysis examined the cost per hundred weight per mile for shipments originating at DLA depots and destined to points in the Continental United States. Data were obtained from the Freight Information System file for FY 85. Comparisons were made of the mean cost per hundred weight per

mile with mileage groups and weight brackets taken into consideration across all DLA depots. These comparisons determined the relative ranking of each depot, the effects of minimum charges associated with the Guaranteed Traffic Program, and the relative effectiveness of various Guaranteed Traffic Programs for the depots. (DLA-LO Project No. 7024)

87-12. Enhanced DLA Distribution System (EDDS) Analysis (April 1987)

The objective of this analysis was to determine the cost savings generated by the use of each alternative city under consideration for the EDDS and to determine the optimal combination of locations. The DLA EDDS concept involves the collection of small vendor shipments destined to DLA depots at a designated point within CONUS for consolidation and shipment, in truckload lots, to the consignee depots. The study looked at the EDDS concept using a computer model which emulated the flow of vendor traffic from vendor locations to receiving depots. Annual savings of approximately \$14 million were identified under the EDDS concept. Several recommendations were made for additional study. (DLA-LO Project No. 7002)

87-11. IMC Equipment Design (April 1987)

The objective of this project was to develop a simulation model of the materials handling enhancements to the Integrated Material Complex (IMC) design developed for Defense Depot Mechanicsburg, PA. In the receiving area, in-check, inspection, 3P&M, and stow module load processes are modeled. In the packing/consolidation area, packing induction, shipping unit consolidation, packing, shipping and shipping sortation processes are modeled. All associated hardware such as rotary racks, robots, conveyor belts, etc. are modeled as well. Simulation results indicate that the IMC design for receiving and packing is feasible from a system hardware standpoint but may require some fine tuning in the area of system operating procedures. Potential problems and bottlenecks stem more from inefficient material flow than inadequate work station or hardware capacity. Specific recommendations include an alternative strategy for matching material release orders, addition of capacity in the receiving in-check area, addition of capacity or reevaluation of time standards in the receiving inspection areas, and methods to keep receiving induction supplied with empty totes. (DLA-LO Project No. 6018)

87-10. Position Management Application Programs (PMAP) User's Instructions (February 1987)

This user's manual describes and provides instructions for using the PMAP microcomputer program. PMAP uses Automated Pay, Cost, and Personnel System (APCAPS) data and provides management information on the structure and manning of DLA offices at all levels of interest. The system also allows for analysis of proposed changes to the structure in order to provide decision support to the manager. (DLA-LO Project No. 6014)

87-09. NMCSs Cost Analysis (December 1986)

The primary objective of this study was to determine the cost difference between using United Parcel Service (UPS) international air service and the United States Postal Service (USPS) for Non Mission Capable Supply (NMCS)

shipments between 1-70 pounds. This objective was generated due to frequent customer complaints regarding the timeliness and lack of traceability of overseas postal (air mail) NMCS shipments sent by USPS. Secondary objectives were to determine the total number of NMCS shipments from all DLA depots and the number of NMCS shipments shipped through New Cumberland Army Depot, PA, and Sharp Army Depot, CA. The study approach consisted of selecting appropriate shipping records from the Mechanization of Warehousing and Shipment Processing Material Release Order History file for a one year period, 1 Jul 85 through 30 Jun 86, and then determining the cost of these shipments under both methods. The use of UPS international air services which provides two to three day service to most European cities and traceability would cost approximately \$400,000 per year, while the current USPS cost is approximately \$265,000. The UPS approach would cost an additional \$135,000.

87-08. Direct Commissary Support System (DICOMSS) Design Simulation
(December 1986)

The objective of this project was to develop a computer simulation model that would be used to validate the automated system design being proposed for the Defense Depot Mechanicsburg Pennsylvania (DDMP) DICOMSS warehousing operation. The approach consisted of obtaining the proposed design, writing the simulation model in SLAM, and using workload data to validate the model. A simulation analysis was then performed on the proposed design. A pick-to-belt system coupled with a bar code sortation system were the main enhancements to the picking and palletizing area. An automated guided vehicle (AGV) system is to be employed to carry pallets from receiving to storage. Several significant recommendations were made concerning the design. The AGV system was not found to be cost effective. A second sortation belt is needed to alleviate congestion and to provide redundancy. In addition, numbers of specific resources (e.g., number of forklifts, turret trucks) to procure were also provided. (DLA-LO Project No. 6004)

87-07. Automated Bid Evaluation Program User's Guide (PC Version)
(November 1986)

The DLA Supply Center Contracting Directorates are responsible for selecting the lowest cost combination of bids on competitive solicitations. These bid evaluations can sometimes be very complex due to multiple line items and additional constraints imposed on offers such as minimum acceptable quantities, all or none conditions, acceptance of line items dependent upon award of other line items, etc. The Automated Bid Evaluation Program (ABEP) was developed to assist DLA contract specialists in handling these complex bids and determine, more quickly and accurately, the lowest cost combination of bidder responses to solicitations. The program is useable on a personal computer. (DLA-LO Project No. 5021)

87-06. The Impact of Contracting Initiatives On Leadtimes (November 1986)

This study investigated the effect of recent contracting initiatives on administrative and production leadtimes for items procured by the four DLA hardware Centers. After collecting and analyzing empirical data on administrative/production leadtimes, results indicate that while administrative leadtimes

continue to increase (in part because of competition initiatives), the leadtimes for competitively awarded large purchases were generally less than the leadtimes for similar sole source contracts. Items which were broken out from sole source to competition experienced reduced lead-times (approximately 30 days reduction in both administrative and production leadtimes) subsequent to the break out. (DLA-LO Project No. 5022)

87-05. Impact of Cycle Changes on DICOMSS (October 1986)

The object of this project was to evaluate the impact on workload at Defense Depot Mechanicsburg, Pennsylvania, resulting from the new 75 day order and ship time (OST) for the support of commissaries in Europe. A previous study (Analysis of Direct Commissary Support System (DICOMSS) Receipt and Issue Workload, see F-86-20) provided receiving and shipping workload data and analysis under previous 55-day OST using data from 10 Sep 85 - 25 Feb 86. These data were compared to data from 10 May 86 - 25 Sep 86 which reflected the new 75-day OST. It was concluded that the impact of the OST cycle change may slightly reduce DICOMSS operational requirements due to the slight decrease in MRO workload, smoothing of workload, and slight decrease in storage requirements.

87-04. A Review and Analysis of the DoD Materiel Returns Program (October 1986)

This report documents a study of the DoD Material Returns Program. The study discusses the current DoD materiel returns policies as contained in DoD Directive 4100.37, Retention and Transfer of Materiel Assets, as well as how the Military Services and DLA have implemented these policies. The major objectives of the study were to: (1) review and document current policies and procedures, (2) identify relevant economic and non-economic decision variables, (3) design a decision algorithm to assist the item manager in making the materiel returns decision, and (4) evaluate the potential costs and benefits which could be achieved by implementation. Actual returns transaction data from the Military Services and DLA for FY 1986 were used in the analysis. Cost estimates of the tasks and activities related to processing the return are also developed. The major finding from the analysis indicates that a significant increase in the volume of returns would be experienced by full implementation of the proposed criteria. The primary reason for this increase can be attributed to using an unconstrained policy for return of weapon system related items. A new decision algorithm for evaluating returns is proposed. The design attempts to minimize the risk of rejecting items that have a high possibility of reutilization while identifying to the item manager the reason for accepting the return. (DLA-LO Project No. 4028)

87-03. DLA Economic Retention/Returns Limits Study (September 1986)

The Defense Logistics Agency is required by DoDD 4100.37, Retention and Transfer of Materiel Assets, to develop economic retention limits that specify the amount of stock to be retained for economic reasons to meet future peacetime demand. This analysis used a breakeven equation to determine the maximum amount of stock that should be retained for economic reasons. The equation balances the two alternatives available: (1) to incur the cost to hold the stock until it is used or (2) to dispose of the stock and take the chance

that it may have to be reprocurd to meet a future demand. In the same manner, the economic returns limit was also investigated. The same breakeven equation was used, except that the expected cost to hold was increased by the cost to return the item to the wholesale depot. The results of the study support setting various economic retention/returns levels based upon the unit cost of an item and the expected remaining life of the item. The study recommends: (1) lower retention limits for those items with higher unit prices, and (2) extended limits for those items with lower unit prices. For less expensive items the returns limit is lower than the retention limit due to the inclusion of the cost of returning an item in the holding cost calculation. (DLA-LO Project No. 4029)

87-02. Economic Analysis Support For Automated Information System Control Board (AISCB) Working Group, Part I, Cataloging-Tools-On-Line (CTOL) Automated Information System Economic Analysis (August 1986)

Current DLA cataloging operations use a manual information system to prepare new item requests and maintain existing cataloging transactions. This economic analysis assessed the economic feasibility of replacing the current manual operations with a CTOL Automated Information System (AIS). Comparison analyses of costs and benefits were made between the current method of operation and the CTOL AIS proposal. Sensitivity analyses were performed on significant costs of the AIS proposal in order to address uncertainty in future cost estimates and to determine what effect any variation in these costs will have on the payback period. (DLA-LO Project No. 6024)

87-01. Depot Transportation "Efficiency Index" Performance Indicator (February 1986)

The objective of this project was to evaluate various transportation factors for inclusion in a composite index which will be meaningful to management in determining a depot's transportation efficiency. The efficiency index is composed of several factors. These factors include: ratio of bin shipping units sent by freight versus bin shipping units sent by mail; average number of shipping units for Government Bill of Lading (GBL); average GBL weight; ratio of shipping units sent by mail versus the number of GBLs. These factors are the terms of a linear combination. They were normalized and weighted and their sum represents the efficiency index. This report describes the process used to build an "efficiency index" to measure depot consolidation of Issue Priority Group III materiel release orders. Specifically, it details the selection of the factors used to construct the index, examines the behavior of each factor, describes the process used to develop a weighting scheme, and gives detailed instructions for computation of the actual index. (DLA-LO Project No. 6010)

86-27. Analysis of Annual Buys (August 1986)

This study evaluated the effects of implementing a minimum annual buy policy at DLA hardware supply centers. A computer model was developed to analyze changes in onhand inventory, contracting workload, storage requirements, safety levels, and funds utilization due to increased procurement cycles. Additionally, savings from increased order quantity price breaks are projected. The study shows that the main benefit of an annual buy policy is savings from price breaks rather than savings in contracting workload as previously expected. The

major costs of the policy appear to be not only increased inventory but also significantly increased storage requirements. The data also demonstrate that not all candidate items show a payback when procurement cycles are changed. (DLA-LO Project No. 5012)

86-26. Surface versus Premium Parcel Post Shipment Cost (July 1986)

The purpose of this study was to determine the transportation cost savings which could be realized by diverting Issue Priority Group (IPG) II shipments moving by premium air parcel to surface parcel post. Cost comparisons of actual costs using premium parcel shipments against estimated costs of the same shipments using surface parcel models were broken down by shipment origin (DLA depot), shipment destination (export versus domestic), and by parcel post zones. The results showed that the benefits of employing surface parcel post for IPG II shipments would be approximately 3.6 million dollars for all depots over a 1-year period. Savings were related to premium air parcel model, shipment weight, and shipment parcel post zone. In general, greater savings are available in express mail and first class mail shipments, in higher weight classes, and in higher parcel post zones. (DLA-LO Project No 6011)

86-25. Measuring and Controlling Price Trends in DLA Spare Parts and DPSC Commodities (June 1986)

This study was undertaken to develop improved methods to measure aggregate price trends in DLA Supply Center (DSCs) contracts. The major objectives of the study were (1) to develop a prototype cost-tracking computer program to measure and explain price trends, (2) to quantify the effect on prices from changes in buy terms (award quantities, degree of competition, acquisition method, and FOB terms), and (3) to develop the means of identifying contractors with unexplained price increases and decreases. The study recommends the incorporation of quantity discount factors into the standard economic order quantity model. The study also recommends the exportation of the prototype cost-tracking computer program to the DSCs for the purpose of measuring price trends on a recurring basis. A by-product of the study was the development of a personal computer program for use by buyers and price analysts to validate unit prices of individual awards. (DLA-LO Project Nos. 5005 and 5023)

86-24. Transportation Rate Tables User's Manual (June 1986)

This manual presents three cost estimating methodologies that can be used for estimating both first and second destination transportation costs. The three methods of estimating transportation costs provide different levels of accuracy. The three methods are: (1) state-based rates, (2) cluster-based rates, (3) mileage-based rates. The actual application of rates is left to the user. The rate structures lend themselves to FORTRAN and COBOL applications and could be modified for use in SPSS and SAS applications.

86-23. Economic Analysis Railway Operations at the Defense Construction Supply Center (DCSC) (June 1986)

The objective of this analysis was to determine if there are alternative means of accomplishing depot railway operations at DCSC at a lower cost. The study found that contract operations of intraplant rail service is not a viable

alternative. The railways contacted have little interest in providing this service. Although it might be profitable for a commercial concern to provide railway service in combination with other depot functions, such service is not large enough in scope to interest commercial activities. Since there is no legitimate alternative, the study recommends that the present system of in-house rail operations be retained.

86-22 Stock Fund Augmentation Study (May 1986)

This report presents an analysis of stocked new provisioning items. The objective of the study was to provide historical statistics on items for which DLA assumed management in FY 1978 through FY 1982. The statistical analysis includes the evaluation of historical demand and support control statistics and a comparison of demand dollars to historical provisioning obligation dollars. Findings indicated that between 8 percent and 19 percent of new items had a demand in their first year, while 17 percent of the new items did not have a single demand during the period observed (1978 to present). Demand increased over time, and the demand dollar figure reached the provisioning dollar figure on an average of 2-1/2 years after establishment of the new item. Findings also indicated that procurement cycle time increased significantly over the life of the new items. (DLA-LO Project No. 4025)

86-21. Economic Analysis of Automating the Meaningful Measures of Merit (M3) System (April 1986)

The economic analysis of automating the M3 system addresses the costs and benefits of M3 providing an alternative to the existing management information system, as used by the Defense Contract Administration Services Regions. The alternatives examined include: maintaining the status quo of presenting management information via the Management Information Report (MIR); automating the M3 and continuing the MIR; automating the M3 and deleting the MIR; implementing the M3 as a nonautomated system; and enhancing the status quo. (DLA-LO Project No. 6006)

86-20. Analysis of Direct Commissary Support System (DICOMSS) Receipt and Issue Workload (April 1986)

The purpose of this study was to assist the Defense Logistics Agency Mechanization Support Office in the design of modernized DICOMSS warehousing facilities at the Defense Depot Mechanicsburg Pennsylvania by providing them with receiving and shipping workload data and analysis. The approach used was to track receiving and shipping workload patterns for 12 14-day cycles. The results showed that item receipt patterns were stable. The majority of items were received and shipped in less than the minimum size lots. Storage location requirements were reasonably processed primarily by the case rather than the current procedure of building pallets from case lots.

86-19. Other Regulated Materiel - Consumer Commodity (ORM-D) Shipment Analysis (April 1986)

Air Force Regulation 71-4 is not consistent with the Code of Regulations, Title 49 with regard to having a proper shipping name of "Consumer Commodities" for ORM-D shipments. Accordingly, ORM-D shipped by military air are more costly

for DLA because of Air Force packaging and labelling requirements that are more stringent than for commercial air. The purpose of this analysis was to examine the inconsistency of the shipping nomenclature applied to ORM-D items and determine what impact these inconsistencies have on transportation charges for DLA shippers. The results of the study showed only minimal impact due to the very small quantity of DLA materiel shipped by military air.

86-18. Provisioning Analysis (March 1986)

This analysis quantitatively evaluated on an item-by-item basis the degree to which the Military Services are overforecasting/underforecasting their requirements for DLA-managed provisioned items. It involved an analysis of Supply Support Request (SSR) provisioning forecasts. The study approach was to create a provisioning/demand file, comparing actual demand to the forecasted SSR requirements; measure the extent of overforecasting or underforecasting; and determine how much of the demand received was from the Service that submitted the initial SSR. The major conclusion of the study was that quantities forecast on the SSR significantly overestimate the true Service Requirement. The results showed that during the first year, more than 90 percent of the items for which SSRs were submitted did not receive a demand. When demand for the second year was considered, the percentage of items without demand decreased to 69 percent.

86-17. Preliminary First Destination Guaranteed Traffic Cost Analysis (March 1986)

This report documents an analysis of transportation costs for vendor source shipments. The analysis examined the charges to move supplies throughout the Continental United States using surface freight modes of transportation. Comparisons were made of the actual first destination transportation costs and the transportation costs that might be realized using carrier rates associated with the Guaranteed Traffic Program (GTP). These comparisons determined the primary savings achieved by DLA using this program, the average savings based upon alternate carrier rates, and the savings using this program for various shipment weight categories. This study identifies the potential primary dollar savings made possible by the GTP. The analysis also determined regional cost trends and possible rate modifications for future carrier solicitations for the GTP. (DLA-LO Project No. 5018)

86-16. Contractor Shipment Distribution Patterns (February 1986)

This study used historical information to identify traffic shipping patterns from supply vendors to first destination depots or customers. The purpose was to identify those geographical areas where carrier performance improvements and cost reductions can be achieved by negotiating for transportation services under guaranteed traffic agreements. The results showed consistent shipping patterns among five of the eight transportation movement categories studied: Truckload/Trailer-On-Flat Car, Flat Bed Trailers, Drop-Framed Trailers, Box Cars, and Less-Than-Truckload categories. These five movement categories showed substantially high shipment frequencies and comparably large shipment tonnages over a period of 1 year. As a result of the study, it was recommended that transportation services and costs be negotiated for those five movement categories. Because of the limited number of shipping patterns for Heavy Duty

Flat Cars and Flat Cars, transportation services should be designated for those areas where traffic is most recurring. Traffic using Tank Trucks/Tank Cars are infrequent and shipping tonnages are low, and thus it does not appear to be advantageous to consider guaranteed traffic for bulk liquid shipments in any conveyances. (DLA-LO Project No. 4011)

86-15. A Study of Demand Forecasting in the Defense Logistics Agency
(February 1986)

The goal of this study was to identify alternative methods which would increase the accuracy of DLA's demand forecasts. The study compared 18 different forecasting methods to determine if improvements over the current DLA forecasting method could be obtained. The methods were compared using both forecast error and impacts on inventory system variables as criteria for judging improvement. The results showed that a weighted average of the forecasts of single exponential smoothing and the four-quarter moving average produced the best results. The preferred method produced a 3.9 percent decrease in the average forecast error over the current system. Positive impacts on safety level dollars and other inventory variables would also be realized.

86-14. Audit of DLA Automated Data Processing/Telecommunications Contracting Office Cost Evaluation Model for ADP Systems (February 1986)

The purpose of this project was to evaluate and analyze the Cost Evaluation Model for ADP Systems used by the DLA Automated Data Processing/Telecommunications Contracting Office. The model was found to be valid and accurate, with no structural program flaws. The formula used to compute present value precisely reflected to 10 percent discount values mandated by DoD. Experimental runs of test data proved the computational logic to be accurate. A tendency of the model, however, to accept erroneous data could significantly distort evaluations and make results meaningless. There was also found to be a lack of both internal and external documentation which underscores a potential problem facing successive administrators tasked with maintaining the model. (DLA-LO Project No. 5025)

86-13. Management by Objectives (MBO) Accounting Program User's Manual
(January 1986)

This user's guide describes the MBO Accounting System Program used for automated storage of all DLA MBOs. The MBO Accounting System Program is interactive in that it allows the user to input, update, and retrieve information about MBOs through user responses to a series of menus. The program is custom built in the dBASE III programming language to require a minimum of user familiarity with programming or data base concepts. The user of this program needs only a casual understanding of microcomputers to begin using it. A step-by-step description of the use of the program is contained in the user's manual. Technical information about the data structures and a program listing is also provided. (DLA-LO Project No. 5015)

86-12. Estimate of the Impact of TRAMS on Personnel Requirements
(January 1986)

The purpose of this study was to arrive at a "best estimate" of the number of personnel required to perform the DCAS transportation management functions once the Transportation Management Systems (TRAMS) is implemented in the DCASRs. The study examined the impact of both centralization and automation due to TRAMS on personnel resources. To project the centralization impact, the study used organizational theory and span-of-control theory. To assess the automation impact, the study looked at the tasks and associated time covered by Special Purpose Data (SPD) and the time and associated tasks that are unmeasured on an individual basis. (DLA-LO Project No. 6007)

86-11. DCASR Data Input Workload Capacity Study (January 1986)

A recent enhancement of the Mechanization of Contract Administration Services (MOCAS) system is the development of an online capability for data input, which is replacing a batch method of data input. The purpose of this study was to develop standards or threshold values for system response times for the online input of contractual documents. Such standards would be the maximum allowable response times which would permit the backlog of documents awaiting input to be kept within an acceptable range. A related aim of the study was to measure the data input productivity improvement associated with the new online system. It was recommended that screen-to-screen response time should not exceed 6 seconds, and summary edit response times should not exceed 68 seconds. Within these times, the backlog of documents awaiting data input will be within acceptable limits. The results also showed that the number of documents per day that an input clerk can process on-line will increase by roughly 15 percent over the batch input method. (DLA-LO Project No. 4024)

86-10. Uniform SAMMS Inventory Management Simulation (USIMS) User's Guide
(January 1986)

Inventory management within DLA is accomplished with the aid of the DLA Standard Automated Materiel Management System (SAMMS). USIMS is an operations research tool which permits evaluation of alternative inventory policies or environmental impacts on the performance of the DLA Supply Centers. USIMS uses a small sample of items in conjunction with a Monte Carlo simulation of various key SAMMS events to produce a wide range of inventory statistics on a proposed set of inventory policies. This USIMS User's Guide provides a complete description of the model and information on how to execute it. (DLA-LO Project No. 5002)

86-09. Physical Inventory Record Accuracy Indicator (January 1986)

DLA currently uses four primary measures to evaluate the physical inventory record accuracy of DLA Supply Centers (DSCs), Defense depots, and Military Service depots storing DLA materiel, but these indicators may conflict. This report describes the results of a study designed to develop a new, single measure of physical inventory record accuracy that can be used to evaluate the relative performance of DSCs and depots. The study examined the measures currently used to indicate physical inventory record accuracy and documents the results of a series of interviews with subject matter experts to determine the

components to be included in the new indicator. An automated decision support system was used to help selected experts assign numerical weights to each component to reflect its relative importance. The results include three new physical inventory record accuracy indicators, one each for DSCs, DLA depots, and non-DLA depots. Each of these indicators will permit an unambiguous ranking of the performance of its respective activities, showing where management attention is most needed. (DLA-LO Project No. 5011)

86-08. Effect of Changing Depot On-Time Standards (December 1985)

This study evaluated the potential consequences of changing the DLA "on-time" standard for depot handling and Continental United States (CONUS) delivery of supplies for routine requisitions (Issue Priority Group Three) from military customers. For the purpose of improving the cost effectiveness of DLA depots, it was proposed to extend the standard from the current 15 days. The analysis consisted of estimating several measures of comparison for the baseline (15-day) and alternative (12-, 18-, 21-, and 24-day) time standards. The primary measures were transportation charges, numbers of shipments according to type, numbers of shipping units, and on-time performance. The findings showed that changing the time standard to 21 days would save approximately 5 million dollars annually in transportation charges alone, without significantly impairing the mission of responding to military customers. (DLA-LO Project No. 5001)

86-07. Cost Benefit Analysis of Publishing DLAM 4140.2 on Microfiche (October 1985)

This analysis was conducted to determine the cost effectiveness of converting DLAM 4140.2, Supply Operations Manual, from paper to microfiche and distributing it thereafter in microfiche form. A questionnaire was sent to the actual users of the manual to aid in the evaluation of the proposal. Three alternatives of status quo and microfiche combinations for meeting the requirements of the proposal were identified and treated in the analysis. Extensive effort was made to obtain cost estimates reflecting current costs. Present value analysis was used to evaluate the comparative cost of investment alternatives. The results showed that conversion to microfiche from magnetic tape is the least costly alternative. However, since the Distributed Minicomputer System project currently underway is expected to provide direct access to most major publications, the conversion of DLAM 4140.2 to microfiche as an interim process is not recommended.

86-06. Cost Benefit Study on the Use of Aluminum versus Wooden Skids in Transporting Industrial Plant Equipment (October 1986)

This study was performed to find a cost effective alternative to the present practice of shipping DoD-owned industrial plant equipment on aluminum and wooden skids. The analysis established that it may be more economical for the Government to switch to an all-wood operation. Considerable savings could be realized even under current operating practices by returning to storage for reutilization those wooden skids presently discarded after one use. (DLA-LO Project No. 4027)

86-05. Evaluation of Demand Forecasting Techniques for the Subsistence
Commodity - Volumes I and II (October 1985)

This study involved the evaluation of quantitative techniques to improve subsistence forecasting. The forecasting techniques analyzed included autoregressions; autoregressions with seasonal terms; simple moving averages, single, double, adaptive, and combined exponential smoothing; naive; and the current DLA methods. Findings showed that about 20 percent more variability in leadtime demand and 14 percent more variability in procurement cycle demand was experienced during the 1980-1983 time period than could have been achieved by a group of five methods identified in this study. The report recommends different groups of techniques for different categories of subsistence items. A prototype subsistence demand forecasting system is described based on the recommended group of models in this study. This study serves as the analytical basis for the development of the Forecasting Module of the Defense Integrated Subsistence Management System. (DLA-LO Project No. 3039)

86-04. The Conceptual Design of an Automated Mobilization Management
Information System (September 1985)

This report defines a logical and potentially achievable set of models and automation systems which will calculate the mission status and capacity of the DLA materiel acquisition, storage, and distribution processes under moderate to severe contingency and mobilization scenarios. The report also identifies the specific actions and resources required to develop the set of models and systems. (DLA-LO Project No. 4017)

86-03. Analysis of a Demand Recording Anomaly (September 1985)

This study analyzed a Standard Automated Materiel Management System (SAMMS) inconsistency between the distribution and requirement subsystems. The purpose of this analysis was to determine the urgency of implementing a SAMMS system change request to correct a current deficiency which may lead to malpositioned stock and increased transportation costs. The results showed that the percentage of stock misrecorded is small and the amount that could be malpositioned would not be located at a depot that is much further from the customer than the optimal storage depot would be. (DLA-LO Project No. 5014)

86-02. DLA Materiel Readiness Support (MARS) System Interface with Service
Readiness Models (September 1985)

This project investigated the potential for interfacing the DLA MARS System with the "sparing-to-availability" models of the Military Services. Although DLA is the DoD wholesale manager of millions of consumable items, it lacks a means for determining how it impacts on the materiel readiness of the Services. This shortfall could be filled by interfacing the MARS System with the models of the Services. The report reviews the capabilities of the MARS System and then considers three popular Service models. The study concludes that an aggregate analytic model approach could be used to relate consumable stock fund investment to weapon system availability by further development of the MARS System. A detailed line item, multi-echelon model approach is ruled out due to lack of application data and the commonality of parts. (DLA-LO Project No. 3087)

86-01. Review of SAMMS Requirements Computations (August 1985)

This review was performed in order to ascertain the effectiveness and efficiency of each of the Standard Automated Materiel Management System (SAMMS) requirements levels pertinent to inventory control in DLA. Each identified requirements level is documented and analyzed to identify potential problems in methodology and implementation. Topics covered include stockage criteria, economic order quantity, leadtime demand quantity, safety level, program-oriented items, life-of-type buys, government furnished materiel, nondemand based levels, control levels, retention limits, credit levels, maximum release quantity, and other war reserve materiel requirements. The findings and conclusions address identified problem areas, potential solutions, and recommended efforts for the development of new methodologies. (DLA-LO Project No. 3040)

APPENDIX A

KEYWORD INDEX

Accountable Property: 88-12, 91-07

Acquisition: 94-36, 95-19.

Administrative Costs: 87-26, 89-05, 89-18, 89-19, 90-09, 90-132, 90-20, 90-28, 91-08, 91-21, 91-30, 91-40, 92-11, 92-13, 92-25, 92-26

Administrative Lead-time (ALT): 87-06, 87-16

Administrative Space: 89-13.

Air Line of Communication (ALOC): 94-11.

Annual Materials Plan (AMP): 93-09, 93-19.

Artificial Intelligence: 88-10, 88-21, 89-02, 89-20, 89-22, 89-35, 91-15, 91-24, 93-09.

Automated Best Value Model (ABVM): 93-27.

Automated Data Processing (ADP): 90-13, 92-25

Automated Data Processing Equipment (ADPE): 86-04, 88-02, 89-33, 89-36, 89-40, 91-28, 91-30.

Automated Data Processing Management: 86-11, 92-16.

Automated Data Processing Systems/Models: 86-04, 86-13, 86-14, 86-21, 86-25, 87-02, 87-07, 87-14, 88-05, 88-09, 88-15, 89-20, 89-31, 90-06, 90-10, 90-12, 90-13, 90-19, 90-24, 90-33, 91-19, 91-24, 91-25, 91-36, 92-09, 92-14, 92-17, 92-18, 92-29.

Automated Data Quality Tool: 95-28, 95-30, 95-31.

Automated Information Systems: 86-11, 87-02, 87-17, 89-33, 89-34, 89-36, 89-40, 91-32, 92-12, 92-31.

Automation of In-Plant OAR Records (AUTOOAR): 93-44.

Automated Inventory Manager (AIMS): 91-15

Automated Pay, Cost, and Personnel System (APCAPS): 87-10.

Automated Storage and Retrieval System (ASRS): 94-04.

Backorders: 87-04, 87-24, 88-11, 90-04, 92-37.

Base Realignment and Closure (BRAC): 93-40, 94-40, 95-20.

Bayesian Estimators: 94-15.

BEM Certification: 95-24.

Benchmarking: 95-06.

Benefits: 91-32, 92-09, 92-17.

Best Value: 94-07, 94-08, 94-35, 95-14.

Bid Evaluation: 86-14, 87-07, 87-14, 87-26, 88-05, 89-05, 89-08, 89-18, 89-19, 89-29, 90-33, 91-03, 91-30, 91-40, 92-18, 92-19, 92-29, 93-27, 95-07.

Binnable Items: 87-22, 88-20, 92-22.

Binnable Storage: 94-04, 94-27.

Budgetary Constraints Requirements: 89-30, 89-39, 91-35, 91-36.

Budget Models: 86-22, 89-16, 89-30, 91-35, 91-36, 92-32.

Bulk Fuel: 94-13, 95-21.

Bulk Items: 91-14.

Business Area Workload DoD Budget Indicators: 94-33.

Cataloging: 87-02, 89-34, 91-21, 95-22.

Cataloging-Tools-On-Line (CTOL): 87-02, 89-34.

Central Purchase: 94-03, 95-12.

CiviCAS: 93-48.

Chemical Protective Suits: 90-22.

Clothing and Textiles (C&T): 86-25, 87-16, 87-18, 88-13, 89-32, 90-1, 90-22.

Commercial Practices: 91-01.

Commissary Support: 86-20, 87-05, 87-08, 89-07, 92-05.

Communication: 94-25.

Communication Devices: 87-15, 89-41.

Communication Survey: 94-25.

Competition: 86-25, 87-06, 87-21, 90-07, 91-03, 92-26, 92-29.

Computer Simulation: 93-06, 93-18, 93-20, 93-30.

Computer Sizing: 87-14, 88-05, 88-09, 89-36, 89-41, 90-11.

Consideration: 94-12.

Consolidated Freight: 87-01, 87-12, 87-22, 88-01, 88-19, 89-23, 89-25, 90-17, 90-21, 90-23, 90-29, 90-30, 91-22, 91-23, 91-26, 91-27, 91-37, 91-38, 91-39, 92-04, 92-08, 92-18, 92-19, 92-20, 93-03, 93-05.

Consolidation and Containerization Point (CCP): 94-23.

Consumable Item Transfer (CIT): 93-06, 93-30, 95-18.

Consolidation and Containerization Point (CCP): 94-23, 95-10.

Containerization: 93-10, 94-23, 95-10.

Container Stuffing Activity (CSA): 94-23, 95-10.

Contingency Planning: 86-04, 89-37, 90-22.

Contract Administration: 86-11, 88-04, 88-10, 90-12, 93-48, 94-28.

Contract Cancellation/Termination: 90-19, 91-25, 94-29, 94-37.

Contract Close-out: 95-06.

Contract Delinquencies: 87-21, 87-26, 90-1.

Contract Management Paperless Automated Support System (COMPASS): 93-44.

Contract Payments: 89-16, 91-08, 91-09.

Contract Pricing: 94-03, 95-07.

Contract Workload: 95-34.

Contracting: 95-13.

Contractor Furnished Material (CFM): 87-16.

Contractor Performance: 95-07.

Contractor Purchasing System Reviews (CPSR): 90-12.

Control Levels: 86-01.

Corporate Contract: 94-19, 95-15.

Corporate Information Management (CIM): 95-06.

Cost: 94-12.

Cost Accounting: 90-13, 90-28, 91-29.

Cost Analysis: 86-08, 86-14, 86-16, 86-17, 86-19, 86-23, 86-24, 86-26, 87-03, 87-09, 87-22, 87-23, 87-25, 87-26, 88-18, 89-05, 89-18, 89-19, 89-33, 89-40, 90-1, 90-08, 90-09, 90-13, 90-15, 90-17, 90-20, 90-21, 90-23, 90-25, 90-27, 90-29, 90-30, 90-32, 91-05, 91-09, 91-12, 91-14, 91-16, 91-20, 91-21, 91-23,

91-25, 91-26, 91-27, 91-28, 91-29, 91-30, 91-33, 91-37, 91-38, 91-39, 91-40,
92-06, 92-08, 92-11, 92-13, 92-20, 92-23, 92-25, 92-26, 92-28, 92-34, 92-36.

Cost Benefit Models: 90-10.

Cost Estimating: 91-15, 91-17.

Cost to Order: 86-27, 90-09.

Cost Recovery: 90-28, 91-29, 92-11, 92-13, 92-34.

Cost Tracking: 86-25, 88-18, 90-13, 90-20.

Credit Levels: 86-01.

Customer Grouping: 93-35.

Customers: 86-08, 88-03, 89-09, 90-18, 93-35.

Customer Satisfaction Survey: 94-10, 94-34, 95-02, 95-25.

Data Dictionary: 91-11.

Data Management: 92-12.

Data Integrity/Quality: 95-30, 95-31.

Data Validation: 95-28, 95-30, 95-31.

Dead Stock: 94-02.

Decision Support Models: 86-10, 878-07, 87-10, 88-08, 88-15, 89-04, 89-08,
89-09, 89-20, 89-21, 89-29, 89-30, 89-32, 89-37, 90-19, 90-24, 90-33, 91-16,
91-19, 91-36, 92-01, 92-03, 92-07, 92-14, 92-18, 92-32, 94-08.

Decommissioning: 94-31, 95-16.

Defense Automatic Addressing System (DAAS): 89-40.

Defense Construction Supply Center (DCSC): 86-23.

Defense Contract Administration Services (DCAS): 87-23, 88-04, 88-15, 89-16,
89-37, 90-25.

Defense Contract Administration Services Region (DCASR): 86-11, 86-12, 86-21,
89-16.

Defense Contract Management Area Office (DCMAO): 92-07, 92-24.

Defense Contract Management Command (DCMC): 87-23, 88-04, 88-15, 89-16,
89-37, 90-25, 93-31.

Defense Depot Mechanicsburg (DDMP): 86-20, 87-05, 87-08, 88-03, 89-03, 90-26.

Defense Depot Memphis (DDMT): 88-03, 89-28, 89-41.

Defense Depot Ogden (DDOU): 88-20.

Defense Depot Richmond (DDRV): 89-14, 89-15, 91-13, 92-23.

Defense Electronics Supply Center (DESC): 91-31, 92-35.

Defense Fuel Supply Center (DFSC): 89-02.

Defense General Supply Center (DGSC): 87-26, 89-13, 89-15, 92-29.

Defense Industrial Plant Equipment Center (DIPEC): 86-06.

Defense Industrial Supply Center (DISC): 88-22, 90-31, 92-35.

Defense Integrated Subsistence Management System (DISMS): 86-05, 87-14, 88-05, 88-09, 92-31.

Defense Logistics Services Center (DLSC): 95-27.

Defense Management Review Decision (DMRD): 93-07, 93-12, 93-21, 93-26.

Defense National Stockpile (DNS): 90-32, 93-09, 93-19.

Defense Performance Review: 95-13.

Defense Personnel Support Center (DPSC): 87-14, 88-05, 88-09, 89-06, 89-10, 91-04.

Defense Plant Representative Office (DPROs): 92-07, 92-24.

Defense Subsistence Offices (DSOs): 91-05, 92-06.

Defense Systems Automation Center (DSAC): 87-14

Defense Reutilization and Marketing Offices (DMROs): 89-01

Defense Reutilization and Marketing Service (DRMS): 87-25, 89-01, 95-35.

Deliberate Planning: 94-01.

Delinquency: 94-07, 94-08, 94-11, 94-35, 95-14.

Demand Variance: 94-15.

Demographic Trends: 91-04.

Depot Consolidation: 93-40, 94-05.

Depot Cycle Time: 95-23.

Depot Management: 86-09, 86-20, 86-23, 87-01, 87-08, 87-11, 87-19, 87-22, 88-10, 88-20, 89-03, 89-04, 89-07, 89-22, 89-23, 89-27, 89-41, 90-26, 91-13, 91-24, 92-14, 92-22, 92-23.

Depot Stock-outs: 95-23.

Design of Experiments: 95-13.

Defense Fuel Supply Center (DFSC): 95-24.

Diminishing Manufacturing Source (DMS): 91-31.

Direct Commissary Support System (DICOMSS): 86-20, 87-05, 87-08.

Direct Support System (DSS): 93-18, 94-11.

Direct Vendor Delivery: 88-06, 94-19.

Discount Rates: 86-14.

Distribution: 86-03, 86-08, 86-16, 86-17, 86-19, 86-290, 86-24, 86-26, 88-01, 89-07, 89-09, 91-32, 91-41, 92-04, 92-06, 92-14, 92-22, 92-28, 94-17, 94-40, 95-20.

Distribution Cost: 93-07, 93-26, 95-32.

DLA Integrated Data Bank (DIDB): 91-10, 92-12, 94-20.

DLA Warehousing and Shipping Procedures (DWASP): 87-19, 88-20, 89-28, 89-41, 91-24.

Draw Down: 94-31, 95-16.

Economic Analysis (EA): 86-06, 86-07, 86-23, 87-02, 87-19, 88-02, 88-18, 89-13, 89-14, 89-33, 89-35, 89-40, 90-14, 92-16, 92-27, 92-31, 93-44, 95-27.

Economic Analysis Procedures: 87-17, 90-10.

Economic Indicators: 89-12.

Economic Order Quantity (EOQ): 86-01, 86-27, 88-06, 90-09, 93-04, 94-43.

Economic Price Adjustments: 91-02, 92-01.

EDMICS: 93-49

Electronic Commerce: 95-22.

Electronic Data Interchange (EDI): 91-03, 91-08.

Energy: 88-16.

Engineering Drawings: 89-34, 93-49.

Enhanced DLA Distribution System (EDDS): see Regional Freight Consolidation Centers.

Environmental Reporting Logistics System (ERLS): 95-27.

Evaluation of Contract Proposals: 93-01.

Excess Material: 87-03, 87-04, 87-25, 90-19, 90-32, 92-36.

Excess On-Order: 90-19, 91-25.

Executive Information System (EIS): 93-45, 94-13, 94-33, 95-21.

Expedited Delivery: 94-32

Expert Systems: 88-10, 88-21, 89-02, 89-20, 89-22, 89-35, 91-24.

Exponential Smoothing: 93-41, 94-43, 95-28.

Facilities, Consolidation: 89-01, 90-25, 91-05, 91-32, 92-16.

Facilities, Management: 88-16, 91-07.

Facilities, Modernization: 86-20, 87-08, 89-03, 89-13, 89-14, 89-28, 90-14, 90-16, 91-13, 92-15.

Facility Locations: 87-12, 87-20, 89-01, 90-25, 91-05, 91-32, 91-41, 92-14, 92-16, 92-25.

Federal Contract Administration (FEDCAS): 94-28.

Focus Survey: 94-10, 94-34, 95-25.

Force Reduction: 94-31, 95-16.

Forecast Decrement Quantities: 95-17.

Forecast Errors: 86-15.

Forecasting, Cash Flow: 93-17.

Forecasting, Demand: 86-05, 86-15, 86-18, 88-22, 89-11, 89-26, 90-22, 91-18, 91-31, 91-36, 92-02, 92-03, 92-05, 92-21, 92-36, 94-15, 94-18, 94-43.

Forecasting, Disbursements: 89-16.

Forecasting, Impact: 93-06.

Forecasting, Price: 86-25, 91-02.

Forecasting, Products and Services: 93-33.

Forecasting, Workload: 86-20, 87-14, 87-15, 88-04, 88-05, 88-09, 89-17, 90-11, 91-35, 91-36, 92-07, 92-22, 92-24, 92-32, 93-31, 94-16, 94-33, 95-34.

Foreign Dependency: 92-10.

FOXPRO: 94-36, 94-41, 95-19, 95-24.

Freight Terminals: 90-14, 90-16.

Fuels: 92-21.

Functional Description: 94-08.

Government Bill of Lading (GBL) Cost: 93-05.

Government Furnished Materiel (GFM): 86-01, 87-16.

Graphical Analysis: 93-16.

Guaranteed Traffic Program: 88-14, 89-24, 90-17, 90-21, 90-23, 90-29, 90-30, 93-34, 95-23.

Hazardous Materials: 88-06, 89-14, 89-22, 91-24, 93-25, 95-27.

High Cost Items: 94-32.

Holding Costs: 87-03, 88-06, 898-19, 90-20, 90-32, 94-38, 94-42, 95-08.

Imported Defense Goods: 93-08.

Indicators, workload: 93-42, 94-16, 94-33.

Indicators, unit cost: 93-33.

Industrial Equipment: 86-06.

Industrial Preparedness Program: 88-08, 89-21, 89-38, 90-02, 91-09, 91-36, 92-10, 92-35, 95-11.

Inflation: 86-25, 89-16.

Information Management: 93-45.

Information Processing Centers: 92-16.

Information Storage Retrieval: 88-02.

Intransit Time: 95-23.

Integrated Computer Aided Manufacturing Definition (IDEF) Modeling: 95-06, 95-22.

Integrated Material Complex (IMC): 87-11, 89-03, 90-26, 94-04.

Internal Communication: 94-25.

Inventory Control Point (ICP): 86-09, 88-21, 89-20, 92-09, 93-35, 93-36, 93-37.

Inventory Control Point Configuration: 93-36, 93-37.

Inventory Reduction: 94-06, 95-07.

Inventory Sampling: 94-22.

Issue Priority Group (IPG): 86-26, 87-01, 89-23, 90-04, 90-15, 90-27, 92-37.

Item Characteristics: 88-17.

Item Deletions/Reductions: 91-21, 92-36.

Item Demand: 86-01, 86-03, 86-15, 86-22, 87-04, 88-22, 89-09, 89-11, 89-26, 89-39, 91-18, 91-31, 92-02, 92-03, 92-05, 92-21, 92-36.

Item Entry: 91-21.

Item Management: 94-44.

Item Selection: 93-14.

Item Selection Indicator Model: 93-14.

Item Stockage: 86-01, 86-03, 87-08, 87-22, 87-24, 88-06, 89-03, 89-17, 89-26, 91-14, 92-06, 92-28, 94-04, 94-27.

J-7 Requirements: 95-29.

Laboratory Testing: 91-34, 92-27, 92-33, 93-28.

Late Deliveries: 87-21, 87-26, 89-18, 90-1, 91-40, 92-29, 94-12.

Lead-time: 94-15, 95-07.

Lead-time Variance: 94-15.

Life-of-Type (LOT) Buys: 86-01, 91-31.

Linear Programming: 94-11, 95-24.

Line Item Pricing: 93-01.

Liquidated Damages: 90-01.

Local Purchase: 94-03, 95-12.

Logistics Data: 91-10.

Logistics Response Time (LRT): 95-23, 95-26.

Logistics Services: 94-13, 95-21.

Logistics Wargame: 95-29.

Long Supply: 92-36, 93-02.

Low Demand: 86-01, 898-09, 89-26.

Lumpy Demand: 89-26.

Maintenance: 88-18.

Major Regional Conflict: 95-29.

Management By Objectives (MBO): 86-13.

Management Indicators: 86-09, 87-01, 88-08, 88-15, 89-16, 90-24, 91-19, 92-12, 92-30.

Management Information System (MIS): 86-13, 90-13, 92-12, 93-45, 94-36, 95-19.

Manpower Planning: 86-12, 87-10, 89-04, 898-37, 90-26, 91-04, 92-07, 92-24.

Market Basket: 93-15, 95-09.

Marketing Surveys: 89-11, 89-12, 91-02.

Mathematical Programming: 93-19.

Materiel Cost: 95-09.

Materiel Handling Equipment (MHE): 87-08, 87-11, 88-20, 89-28, 90-14, 90-16, 91-13, 92-15, 92-23.

Materiel Management: 94-16.

Materiel Readiness Support (MARS) System: 86-0-2, 89-31.

Materiel Release Orders (MROs): 87-05, 87-09, 88-01, 95-26.

Materiel Release Quantity (MRQ): 86-01, 90-03.

Maximum Award Quantity: 90-02.

Maximum Release Quantity: 86-01, 90-03.

Meaningful Measures of Merit (M3): 86-21.

Mechanization of Contract Administration Services (MOCAS): 86-11, 86-36, 90-11, 91-08.

Mechanization of Warehousing and Shipping Procedures (MOWASP): 87-09, 89-28.

Medical Air Line of Communication (MEDALOC): 90-16.

Medical Items: 86-25, 89-29, 90-04, 90-33, 91-03, 92-11.

Metrics: 94-19, 95-13, 95-15.

Microcircuits: 91-31.

Military Construction (MILCON): 89-13, 89-14, 91-32.

MILSPEC: 94-03, 95-12.

Ministacker: 94-27.

Mission Essential Materiel: 94-13, 95-21.

Mobilization Planning: 86-04, 88-08, 89-37, 89-38, 90-22, 91-36, 92-32.

National Performance Review: 94-03, 95-12, 95-13.

Net Landed Cost: 95-32.

Nonconforming Material: 87-23, 88-13, 89-06, 89-19, 90-07, 90-20, 90-31, 91-20, 91-34, 94-38, 95-08.

Nondemand-Based Levels: 86-01.

Non Mission Capable Supply (NMC): 87-09.

Obsolescence Rates: 91-31.

Operation Desert Shield/Storm (ODS): 93-43.

Optical Disk: 93-49

Optimization: 94-17, 94-40, 95-20.

Order Ship Time (OST): 87-05, 90-18, 91-22, 93-18, 93-39.

Organization Modeling Program (OMP): 93-32.

Organizational Studies: 87-10, 90-06, 90-25.

Out-of-Area Shipments: 86-03, 92-04, 95-23.

Over and Above Centralized Information System (OACIS): 94-39.

Overseas Customers: 93-10.

Packaged Petroleum: 88-10, 88-20, 89-28, 91-17.

Packing/Packaging: 88-10, 88-20, 89-28, 91-17.

Parcel Post: 86-26, 87-09.

Payroll Systems: 87-10.

Personnel: 86-11, 87-10, 89-04, 89-15, 90-26, 91-04, 91-33, 92-25.

Personnel Support: 95-21.

Physical Inventory: 86-09, 88-12.

Pipeline Inventory Costs: 95-23.

Position Management: 87-10, 90-06.

Position Management Application Program: 87-10, 90-06.

Post Award Consideration: 94-12.

Pre-Award Surveys: 88-10, 89-05.

Preparedness: 94-13, 95-21.

Price Reasonableness/Analysis: 86-25, 88-17, 89-35, 91-02, 91-15, 92-26, 95-18.

Price Trends: 86-25, 89-11, 89-12, 91-02, 92-26.

Primary Distribution Site (PDS): 93-12, 93-21.

Privatization: 95-35.

Process Improvement: 95-06

Processing Cost for Duty-Free Entry Certificates: 93-08.

Procurement: 86-25, 86-27, 87-06, 87-07, 87-16, 87-21, 87-26, 88-17, 89-02, 89-05, 89-08, 89-11, 89-17, 89-18, 89-19, 89-21, 89-29, 90-02, 90-19, 90-20, 90-33, 91-01, 91-03, 91-16, 91-30, 91-40, 92-11, 92-13, 92-25, 92-26, 92-29, 92-34, 94-07, 94-08, 94-29, 94-35, 94-36, 95-07, 95-09, 95-13, 95-14, 95-19.

Procurement Administrative Lead-time (PALT): 86-01, 87-06, 91-01, 91-03, 92-25.

Procurement Cycles: 86-01, 86-22, 86-25, 86-27.

Production Base: 88-08, 89-11, 89-12, 89-21, 90-02, 90-22, 91-06, 91-31, 91-36, 92-10.

Production Lead-time (PLT): 87-06, 87-16, 89-18, 91-04, 93-04.

Program Oriented Items (POIs): 86-01.

Property Analysis: 93-11.

Property Management: 88-12, 91-07.

Provisioning: 86-01, 86-18, 86-22, 87-24.

Publishing: 86-07.

Purchase Decisions: 86-06, 88-10, 89-20, 89-30, 90-33, 91-01, 91-30, 92-11, 92-13, 92-29, 92-34.

Purchase Requests: 95-19.

Purchasing Review: 93-16.

Quality Assurance/Control: 87-23, 88-13, 88-15, 89-06, 89-10, 90-05, 90-07, 90-24, 91-19, 91-20, 91-34, 92-07, 92-29, 92-33, 94-07, 94-08, 94-35, 95-14.

Quality Assurance Resource Model (QUARM): 93-42.

Quality Deficiency Reports (ODRs): 89-19, 90-20.

Quality Inspections: 87-23, 88-13, 89-06, 89-10, 90-31, 91-20, 91-34, 92-27.

Quantity Price Breaks: 86-25, 86-27.

Quality Assurance: 93-13, 95-13.

Quality Effective Sensing Technique (QUEST): 93-13.

QUICKTRANS: 93-34.

Railway: 86-23.

Random Sampling: 93-46, 94-41.

Rapid Response Mobilization Indicator Model: 94-14.

Readiness: 86-02, 89-30, 89-31, 91-11, 91-36, 92-37, 93-47.

Real-Time Processing: 86-04.

Receiving: 86-20, 87-11, 87-22, 88-20, 89-22, 89-27, 91-14, 91-24.

Recommended Buys: 89-20, 89-30, 92-03.

Redistribution: 87-04, 87-25, 92-04.

Regional Freight Consolidation Centers (RFCC): 87-12, 87-20, 88-19, 90-14, 90-17, 90-18, 90-21, 90-23, 90-29, 90-30, 91-22, 91-23, 91-26, 91-27, 91-37, 91-38, 91-39, 92-08, 92-15, 92-18, 92-19, 92-20, 93-03, 93-05, 93-20, 93-39.

Regression Analysis: 93-42, 94-09, 95-34.

Reorder Point (ROP): 86-01, 86-27, 95-03, 95-05.

Reorder Quantity: 95-05.

Reparables: 91-16.

Replenishment Policy: 89-03, 89-20.

Reports of Discrepancies (RODs): 90-20, 94-42.

Requisitions: 87-25, 88-11, 90-04.

Requirements Determination: 95-04.

Requirements Levels: 95-03, 95-05.

Response Time: 86-08, 86-11, 94-03, 94-19, 94-43.

Retention Limits: 94-02, 94-06.

Retention/Returns: 86-01, 87-03, 87-04, 88-06, 92-36.

Return On Investment (ROI): 93-28.

Return Limits: 94-06.

Risk Analysis: 92-10, 92-35.

Safety Level: 86-01, 86-15, 87-18, 88-22, 89-32 89-39, 91-11, 93-04, 95-03, 95-05.

Sales: 86-22, 90-28, 92-13.

Sampling Plans/Procedures: 88-13, 89-10, 90-31, 91-07, 91-34, 92-33, 93-15, 93-29, 93-46, 94-22, 95-02.

Seasonality: 86-05, 89-26.

Seavan-stuffing: 94-23, 95-10.

Seavan-unstuffing: 94-23.

Service Data: 94-20.

Shelf-Life: 88-06, 89-29, 90-33.

Shipping Procedures: 86-08, 86-16, 86-17, 86-19, 86-20, 86-24, 86-26, 87-09, 87-13, 88-01, 88-03, 88-07, 88-19, 89-09, 89-23, 89-24, 89-25, 90-15, 90-27, 91-22.

Simulation, Depot: 87-08, 87-11, 88-20, 89-07, 89-28, 90-16, 91-13, 92-15.

Simulation, Inventory: 86-10, 87-24, 88-06, 89-32, 90-04.

Simulation, Demand: 94-43.

Simulation, Requirements: 89-32.

Site Selection: 93-21.

Skids: 86-06.

Smoothing Constant: 94-43.

Sourcing: 94-01.

Spec Busting: 95-36.

Split Delivery: 95-01.

Supply Management: 95-07.

Staffing Model: 93-31, 94-09.

Standard Automated Materiel Management System (SAMMS): 86-01, 86-03, 86-10, 88-22, 89-33, 90-04, 92-09, 94-26.

Standard Automated Materiel Management System By Electronic Data Interchange (SPEDE): 91-03.

Standard Procurement System (SPS): 95-33.

Standards Improvement Plan (SIP): 95-36.

Statistical Models: 90-05, 91-34, 92-33.

Statistical Process Control: 93-41, 95-28, 95-30, 95-31.

Statistical Screening Techniques: 95-28.

Stockage Levels: 88-06.

Stock Fund: 86-02, 86-22, 89-30, 89-39, 90-28, 92-13, 92-34.

Stockpile: 90-32.

Stock Positioning: 87-22, 91-14, 91-41, 92-06, 92-28, 93-21, 93-23, 93-25, 94-21, 94-30, 95-23.

Stopoff: 95-01

Storage Procedures: 86-06, 87-08, 87-11, 89-03, 89-27, 92-05, 92-06.

Storage Plans: 94-05.

Subsistence: 86-05, 86-20, 87-14, 88-05, 88-09, 89-07, 89-10, 89-11, 89-12, 89-21, 90-02, 90-03, 90-05, 91-01, 91-02, 91-05, 91-06, 92-01, 92-02, 92-03, 92-04, 92-05, 92-06, 92-31.

Sufficiency Analysis: 95-33.

Suppliers: 88-15, 90-24, 91-01, 91-19, 92-10.

Supply Availability/Performance: 86-02, 86-08, 87-18, 88-06, 88-11, 88-22, 89-07, 89-26, 89-30, 89-31, 90-04, 91-11, 91-22, 91-36.

Supply Control Study: 88-10, 88-21, 89-20.

Supply Planning/Management: 88-08, 88-10, 88-22, 89-20, 89-30, 89-32, 89-39, 90-22, 91-11, 91-31, 91-35, 91-36, 92-17, 92-32, 94-05, 94-06.

Supply Support Requests (SSRs): 86-03, 86-18.

Surcharge: see Cost Recovery.

Tape Cartridge: 88-02.

Technical Analysis of Cost Proposal (TACP): 89-35, 91-15.

Technique for Order Preference by Similarity to Ideal Solution (TOPSIS): 95-11.

Telecommunications: 87-15, 89-41.

Telephones: 87-15.

Termination Decision Model: 94-37.

Time Phased Force Deployment (TPFD): 93-43.

Transaction Volumes: 87-14, 90-11.

Transit Time: 86-08, 88-01, 88-07, 90-18, 91-22.

Transportation: 86-08, 86-12, 86-16, 86-17, 86-19, 86-23, 86-24, 86-26, 87-01, 87-12, 87-13, 87-20, 87-22, 87-25, 88-01, 88-14, 88-19, 89-24, 89-25, 90-08, 90-15, 90-17, 90-18, 90-21, 90-23, 90-27, 90-29, 90-30, 91-05, 91-09, 91-12, 91-14, 91-23, 91-26, 91-27, 91-32, 91-37, 91-38, 91-39, 92-04, 92-08, 92-14, 92-18, 92-19, 92-20, 93-34, 95-23.

Transportation Management Systems (TRAMS): 86-12.

Transportation Rates: 86-24, 87-13, 89-24, 89-25, 90-15, 90-17, 90-21, 90-23, 90-29, 90-30, 91-23, 91-26, 92-18, 92-19.

Transportation Shipping Practices: 95-01.

Travel Policy: 94-24.

Uniform Materiel Movement and Issue Priority System (UMMIPS): 94-11.

Uniform SAMMS Inventory Management Simulation (USIMS): 86-10.

Unit Prices: 86-25, 86-27, 88-17, 91-29.

USAF Wing Commanders' Test: 94-03, 95-12.

Variance Indicators: 88-15, 90-24.

Variable Safety Level: 89-32.

Vendor Ratings/Performance: 88-15, 90-24, 91-29, 92-29, 93-03.

War and Emergency Planning: 86-04, 88-08, 91-36.

Warfighting: 93-47, 94-01, 94-13, 94-14, 94-26, 95-21.

War Reserve: 86-01, 94-13, 95-21.

Warehousing: 87-08, 87-11, 89-03, 89-41, 92-05, 92-23.

Weapon System Supply Support: 91-11, 94-13, 94-14, 94-43, 95-21.

Wholesale vs Retail: 95-04.

Workload Drivers: 93-31.

Workload Leveling: 86-11, 86-12, 87-05, 89-04, 90-26, 92-07, 92-22, 92-24.

Workload Indicators: 93-42, 94-16, 94-33.

Workload Model: 93-48.

Zero Demand: 94-02.